Backward Bending, Forward Falling, and Inverted S Labor Supply Curves: US and Mexico

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Abstract of the Dissertation

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This dissertation studies and compares the individual and household Labor Supply Curves (LSCs) of a developing Mexican versus a developed American economy.

In the individual case, our results suggest that regardless of the underlying assumption of heterogeneous or homogeneous units of labor -that is, disaggregating or not the labor market by levels of education-, the individual American and Mexican LSCs exhibit a backward bending (inverted C) and a forward falling (C) shapes respectively, implying the existence of a survival constraint at very low wages, not observed in the more developed American economy. Considering both economies together, an international inverted S LSC is observed.

In the household case, our results suggest once again that, regardless of the underlying assumption of heterogeneous or homogeneous units of labor, the observed American and Mexican household LSCs present a backward bending and a

forward falling shapes respectively. However, if a cubic functional form is allowed in the Mexican case, an inverted S shape is also supported by the data.

We propose a theoretical static structural model consistent with the empirical behavior described above. It constitutes the first model able to replicate in a household framework all the aforementioned shapes. The model can be collapsed into an individual framework, where a set of special cases comprises the simplest models in the economic literature able to generate backward bending and forward falling LSCs. All of them have a close form solution. These models demonstrate that the agents' behavior underlying the abovesaid LSC shapes constitutes an optimal response in the absence or presence of a survival constraint.

Additionally, we propose an alternative way of analyzing the labor market, by presenting a moving average of the locus of equilibria by deciles of wages.

Our results have non-trivial economic policy implications on the optimal minimum wage and public education - poverty cycles in the Mexican economy. They also affect the optimal labor-income tax policy in the American economy.

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Chapter 1

Introduction

This dissertation studies and compares the individual and household Labor Supply Curves (LSCs) of a developing Mexican versus a developed American economy. Important differences in their labor markets do not allow us to assume a priori the same LSC shapes. The main difference, upon which we base our study, is the wage range faced by their agents.

In the individual case, our results suggest that regardless of the underlying assumption of homogeneous or heterogeneous units of labor -that is, disaggregating or not the labor market by levels of education-, as well as considering or not sample selection bias, the individual American and Mexican labor supply curves exhibit a backward bending (inverted C) and a forward falling (C) shapes respectively, implying the existence of a survival constraint at very low wages, not observed in the more developed American economy. Considering both economies together, an international inverted S shape is observed.

If only a linear functional form is allowed, a constant positive and negative slopes are supported by the American and Mexican data respectively. In the American case, this slope increases at labor markets with more years of education, supporting (given the correlation between education and wages) an overall backward bending LSC. In the Mexican case, this result supports the conclusion of a negative slope at low wages.

In the household case, our results suggest once again that, regardless of the underlying assumption of heterogeneous or homogeneous units of labor, as well as considering or not sample selection bias, the observed American and Mexican household LSCs present a backward bending and a forward falling shapes respectively. Nonetheless, if a cubic functional form is allowed in the Mexican case, an inverted S shape is also supported by the data.

More precisely, considering working hours as a function of wages, the backward bending LSC observed in the American economy corresponds to the plot of the function in which the domain contains the highest range of argument (wage) values. Once we extend the domain to values close to zero -the developing case- we observe a forward falling LSC. When agents of both economies face the same wage, they offer a similar number of working hours. Considering both wage ranges together, an inverted S shape LSC is generated.

We propose a theoretical static structural model consistent with the empirical behavior described above. It constitutes the first model able to replicate in a household framework all the aforementioned shapes. The model can be collapsed into an individual framework, where a set of special cases comprises the simplest models in the economic literature able to generate backward bending and forward falling LSCs. All of them have a close form solution. These models demonstrate that the agents' behavior underlying the abovesaid LSC shapes constitutes an optimal response in the absence or presence of a survival constraint.

In the economic literature, the theoretical individual backward bending LSC is broadly assumed in labor text books. Nevertheless, it still faces some weakness issues; first, by concluding that the observed LSC presents just a positive slope all along it (Barzel 1973, Lundberg 1985), the existent empirical research does not support the same[1]; second, only two papers propose theoretical structural models able to generate it[2]: Hanoch (1965) assuming a double exponential utility function -where the backward bending shape can be generated only for certain consumption/leisure ratios-, and Barzel (1973) using a minimum amount of leisure and consumption constraints.

[1]It is worth noting that given that the substitution and income effects can dominate each other, the neoclassical model of labor-leisure choice does not conclude any specific shape for the LSC.

[2]In a third paper, Lin (2003) claims that his model is able to generate the backward bending LSC, but his results are still under consideration.

In the previous discussion, this dissertation collaborates by presenting empirical evidence of an individual backward bending shape in a developed economy and by providing the simplest individual static structural model able to generate it.

The idea of a negatively-sloped LSC in developing societies has been in the economic literature for several years (Boeke 1953, Berg 1961, Shultz 1964, Lipton 1983). Intuitively speaking it has been explained by arguing some irrational behavior, such as the existence of limited aspirations or wants, or a target income, that provokes people facing low wages to work less when wages increase. So far, no formal structural model has been presented that supports these ideas.

By presenting empirical evidence of the existence of a forward falling LSC in the individual and household cases in the developing Mexican economy, as well as the structural models that support it, this dissertation demonstrates that the negative slope only exists at very low wages, not observed in developed societies, where agents face a survival constraint that makes them work more when wages decrease. Once agents of both economies face similar wages, they offer similar working hours.

Our results suggest that, considering two economies with different level of development together, or more specifically speaking, different wage ranges, an international inverted S LSC is observed. Although this result is new in the economic literature, the intuitive discussion of the possibility of observing this shape in a single national economy is not new (Sharif 2000, Dessing 2001, and Nakamura and Murayama 2010).[3]

Regarding the shape of the household LSC the economic literature is not specific.[4] This has been advocated to study cross effects at the interior of households, but no specific shape has been proposed for the household LSC. Among others, Heckman (1974) found that the wife's asking wage increases by five percent each

[3]Dessing and Sharif discuss the economic intuition of an inverted S LSC and present empirical evidence of just a negatively-sloped LSC. Dessing tries to formalize the intuition by presenting a family model without specifying a utility function. By assuming a decreasing elasticity of substitution and the use of a shift in the utility function, Nakamura and Murayama try to model this shape in an individual case.

[4]One exception is Dessing, who discusses the household inverted S LSC.

time that the husband's wage increases one dollar, Lundberg (1988) found that families that have young children also have negative cross earnings effects, and Murphy (1997) found that women married with middle and high wage men have received larger employment and earning gains.

In order to propose a specific shape for the household LSC, we set the working hours of all the members of a household as a function of the most relevant monthly real wage for it -the largest one-, whose receiver is considered the economic head of the household, considering this way all the members of a household as a unit. In this issue, this dissertation contributes by presenting empirical evidence of a household backward bending LSC for the American economy and a forward falling and inverted S for the Mexican one. We also present the first static structural model able to generate all these shapes in a household framework.

Our individual and household results have non-trivial economic policy implications on the optimal minimum wage and public education - poverty cycles in the Mexican economy. They also affect the optimal labor-income tax policy in the American economy.

Additionally, we propose an alternative way of analyzing the labor market, by presenting a moving average of the locus of equilibria by deciles of wages. This technique provides us with the observed average number of working hours at different wages, regardless of the supply and demand curve shapes. In other words, the obtained plots provide the average final result at each wage decile after the interaction of supply and demand curves.

Chapter 2

Individual and Household Backward Bending, Forward Falling, and Inverted S Labor Supply Curve Models

2.1 Introduction

The target of this chapter is to provide with a theoretical static framework any research about the shape of individual or household Labor Supply Curves. We present a general static structural model able to generate inverted S, forward falling, and backward bending LSCs, as well as forward falling and backward bending LSCs in a household and individual frameworks respectively.

Some special cases of the same model are also presented. These simpler models are able to generate, with less variables and parameters, a household backward bending LSC as well as individual forward falling, negatively sloped, and backward bending LSCs.

As far as we know, our general model constitutes the first static structural model able to generate in a household framework the aforementioned shapes. Our special cases constitute the simplest static structural individual models able to generate a backward bending and a forward falling shape.

All the models here presented have a close form solution. Mathematical proofs and simulations are also provided.

In the economic literature there exist three papers that claim to be able to generate the broadly known individual backward bending LSC. Hanoch (1965) presents a double exponential model able to generate the backward bending shape only for certain consumption-leisure ratios. Barzel (1973) presents a model with a minimum level of consumption and leisure, able to generate different individual LSC shapes, and Lin (2003) also claims his model is able to generate this shape, although this last one is still under consideration.

Regarding household theoretical models able to generate the aforementioned shapes, we can say that the economic literature has been advocated to identify cross effects at the interior of households[1], paying few attention to the shape of the household LSC.

Regarding the inverted S LSC, two papers in the economic literature have tried to model it in an individual framework, Sharif (2000) and Nakamura and Murayama (2010), and one in a household framework, Dessing (2001). Sharif uses a decreasing elasticity of substitution utility function and is able to generate only the forward falling area of the inverted S; Nakamura and Murayama assume also a decreasing elasticity of substitution utility function and use a shift in the same; and, Dessing tries to formalize the intuition of a household inverted S by presenting a family model without specifying a utility function and by considering only one wage -the average one, making the model a lonely agent model-, consequently, no formal specific conclusions can be derived from the mathematical model except by the fact that, given the subsistence constraint that the family faces, the LSC of the family should have a negative slope at low wages.

It is worth noting that we are able to generate the negative slope at low wages thanks to the inclusion of a minimum survival level of consumption; and, we arrive to a close form solution thanks to the exclusion of $1/\sigma$ in a CES utility function and the use of only one value of δ for both agents -differentiating their preferences by different α_i-. Our proposed utility functions are well behaved, in the sense that they are increasing in its arguments, present decreasing marginal utilities, and are continuously differentiable.

[1]One exception is Dessing (2001).

As stated, we present -as a special case of our general model- the simplest individual static structural model able to generate a backward bending LSC. It only requires one simple assumption, leisure and consumption are gross complements. By way of explanation, the path that allows us to generate a backward bending LSC is focusing our attention on the idea that leisure and consumption should be more complements than substitutes. Put differently, the agent is not so willing in substituting leisure for consumption once she already have a high level of labor income. Thus, considering the Cobb-Douglas utility function as the border -where the share of income spent in each argument is constant independently of prices-, we should have a utility function that lies in the area between the Cobb-Douglas and the perfect complement cases, where the share of income spent in one argument increases after an increment in its price.

2.2 The General Household Model

In this section we present our general household static structural model. It is able to generate inverted S, forward falling, and backward bending household LSCs. By defining the weight given to the utility of the second agent and the local public good equal to zero ($\mu \equiv 0$ and $G \equiv 0$), the model collapses to an individual model able to generate forward falling, negatively sloped, and backward bending LSCs.

In the model agents from the same household maximize a joint utility. They receive utility from own leisure, own consumption -as long as it is above a minimum level of consumption constraint (c*)- and a local public good; each agent faces an individual time and a common budget constraint.

$$max[U_1(l_1, c_1 - c*, G) + \mu U_2(l_2, c_2 - c*, G)] \tag{2.1}$$

subject to

$$h_1 + l_1 = 1 \tag{2.2}$$

$$h_2 + l_2 = 1 \tag{2.3}$$

$$h_1 w_1 + h_2 w_2 + y \geq c_1 + c_2 + G \tag{2.4}$$

where l_1, l_2, c_1 and c_2 state for leisure of agent 1, leisure of agent 2, consumption of agent 1 and consumption of agent 2 respectively, h_1 and h_2 represent working time of agents 1 and 2 respectively, y is common non-labor income, and G stands for the local public good. The price of the consumption good is normalized to one and the total amount of time that each agent can distribute between leisure and working is one.

Substituting (2.2) and (2.3) in (2.4) we get the final budget constraint

$$(1 - l_1)w_1 + (1 - l_2)w_2 + y \geq c_1 + c_2 + G \tag{2.5}$$

We propose the following utility functions

$$U_1 = \frac{\alpha_1 l_1^\delta}{\delta} + \frac{\beta_1 (c_1 - c*)^\delta}{\delta} + \frac{(1 - \alpha_1 - \beta_1) G^\delta}{\delta} \tag{2.6}$$

$$U_2 = \frac{\alpha_2 l_2^\delta}{\delta} + \frac{\beta_2 (c_2 - c*)^\delta}{\delta} + \frac{(1 - \alpha_2 - \beta_2) G^\delta}{\delta} \tag{2.7}$$

Thus, the joint utility function that agents from the same household maximize is

$$\frac{\alpha_1 l_1^\delta}{\delta} + \frac{\beta_1 (c_1 - c*)^\delta}{\delta} + \frac{(1 - \alpha_1 - \beta_1) G^\delta}{\delta} + \mu [\frac{\alpha_2 l_2^\delta}{\delta} + \frac{\beta_2 (c_2 - c*)^\delta}{\delta} + \frac{(1 - \alpha_2 - \beta_2) G^\delta}{\delta}] \tag{2.8}$$

Although having different deltas for different agents would seem more plausible, there are two reasons for having only one: a) The two agents have different alphas and betas, so they can give completely different weights (preferences) to consumption, leisure, and the local public good, and, b) Having only one delta allows the model to arrive to a close form solution regarding the optimal allocation of time.

Solving the Model:
After setting the Langragian and taking First Order Conditions (FOC) with respect to c_1, c_2, l_1, l_2, G and λ we arrive to a system of six equations with six unknowns:

$$l_1 : \frac{\alpha_1 l_1^{\delta-1}}{w_1} = \lambda \tag{2.9}$$

$$l_2 : \frac{\mu \alpha_2 l_2^{\delta-1}}{w_2} = \lambda \tag{2.10}$$

$$c_1 : \beta_1 (c_1 - c*)^{\delta-1} = \lambda \tag{2.11}$$

$$c_2 : \mu \beta_2 (c_2 - c*)^{\delta-1} = \lambda \tag{2.12}$$

$$G : (1-\alpha_1-\beta_1) G^{\delta-1} + \mu(1-\alpha_2-\beta_2) G^{\delta-1} = \lambda \tag{2.13}$$

$$\lambda : (1-l_1) w_1 + (1-l_2) w_2 + I = c_1 + c_2 + G \tag{2.14}$$

By combining equations (2.9) to (2.13) and substituting the results in (2.14) we are able to obtain the optimal allocation of time to leisure of both agents (l_1) and (l_2). Using the time constraint of each agent we find the optimal allocation to work as a function of wages, parameters, and the constant non labor income (y).

$$h_1 = 1 - \frac{w_1 + w_2 + y - 2c^*}{w_1 + (\frac{\mu\alpha_2}{\alpha_1})^{\frac{1}{1-\delta}} (\frac{w_1}{w_2})^{\frac{1}{1-\delta}} w_2 + (\frac{\beta_1 w_1}{\alpha_1})^{\frac{1}{1-\delta}} + (\frac{\mu\beta_2 w_1}{\alpha_1})^{\frac{1}{1-\delta}} + (\frac{w_1[(1-\alpha_1-\beta_1)+\mu(1-\alpha_2-\beta_2)]}{\alpha_1})^{\frac{1}{1-\delta}}} \tag{2.15}$$

$$h_2 = 1 - (\frac{\mu\alpha_2}{\alpha_1})^{\frac{1}{1-\delta}} (\frac{w_1}{w_2})^{\frac{1}{1-\delta}} \frac{w_1 + w_2 + y - 2c^*}{w_1 + (\frac{\mu\alpha_2}{\alpha_1})^{\frac{1}{1-\delta}} (\frac{w_1}{w_2})^{\frac{1}{1-\delta}} w_2 + (\frac{\beta_1 w_1}{\alpha_1})^{\frac{1}{1-\delta}} + (\frac{\mu\beta_2 w_1}{\alpha_1})^{\frac{1}{1-\delta}} + (\frac{w_1[(1-\alpha_1-\beta_1)+\mu(1-\alpha_2-\beta_2)]}{\alpha_1})^{\frac{1}{1-\delta}}} \tag{2.16}$$

If we consider the utility function of this model a CES utility function then we can express the previous two functions as

$$h_1 = 1 - \frac{w_1 + w_2 + y - 2c^*}{w_1 + (\frac{\mu\alpha_2}{\alpha_1})^\sigma(\frac{w_1}{w_2})^\sigma w_2 + (\frac{\beta_1 w_1}{\alpha_1})^\sigma + (\frac{\mu\beta_2 w_1}{\alpha_1})^\sigma + (\frac{w_1[(1-\alpha_1-\beta_1)+\mu(1-\alpha_2-\beta_2)]}{\alpha_1})^\sigma} \quad (2.17)$$

$$h_2 = 1 - (\frac{\mu\alpha_2}{\alpha_1})^\sigma(\frac{w_1}{w_2})^\sigma \frac{w_1 + w_2 + y - 2c^*}{w_1 + (\frac{\mu\alpha_2}{\alpha_1})^\sigma(\frac{w_1}{w_2})^\sigma w_2 + (\frac{\beta_1 w_1}{\alpha_1})^\sigma + (\frac{\mu\beta_2 w_1}{\alpha_1})^\sigma + (\frac{w_1[(1-\alpha_1-\beta_1)+\mu(1-\alpha_2-\beta_2)]}{\alpha_1})^\sigma} \quad (2.18)$$

On figures 2.1.a and 2.1.b we can observe that this model is able to generate, among other LSCs, an inverted S and a forward falling LSC for certain parameter values.

[Figure 2.1 here]

2.3 Special Cases of the General Model

With the target of providing the reader with simpler models able to generate well known LSCs, we present in this section special cases of our general model that do not require some variables and parameters. These models constitute special cases because the same results can be obtained by defining these variables and parameters equal to zero.

2.3.1 The Household Backward Bending Static Structural Model

In this subsection we present the first special case of our general model. We simplify the general model by excluding the local public good and the minimum amount of consumption constraint. We would get the same result by defining $G \equiv 0$ and $c^* \equiv 0$ in the general model. This household static structural model is able to generate the backward bending shape that we observe in American households, presented in chapter IV.

In this static structural model, agents from the same household maximize their joint utility. They receive utility from own leisure and common consumption, each agent faces an individual time and a common budget constraint.

$$max[U_1(l_1,c)+\mu U_2(l_2,c)] \tag{2.19}$$

subject to

$$h_1+l_1=1 \tag{2.20}$$

$$h_2+l_2=1 \tag{2.21}$$

$$h_1w_1+h_2w_2+y\geq c \tag{2.22}$$

where l_1, l_2, and c state for leisure of agent 1, leisure of agent 2 and common consumption respectively, h_1 and h_2 represent working time of agents 1 and 2 respectively, and y is common non-labor income. The price of the consumption good is normalized to one and the total amount of time that each agent can distribute between leisure and working is one.

Substituting (2.20) and (2.21) in (2.22) we get the final budget constraint

$$(1-l_1)w_1+(1-l_2)w_2+y\geq c \tag{2.23}$$

We propose the following utility functions

$$U_1=\frac{\alpha_1c^\delta}{\delta}+\frac{(1-\alpha_1)l_1^\delta}{\delta} \tag{2.24}$$

$$U_2 = \frac{\alpha_2 c^\delta}{\delta} + \frac{(1-\alpha_2) l_2^\delta}{\delta} \tag{2.25}$$

Some characteristics of the previous utility functions are worth noticing. Independently of whether this type of utility function is considered or not a CES utility function, it is, as any well behaved utility function, an increasing function of consumption and leisure, continuously differentiable, and the marginal utility of consumption and leisure is decreasing in both arguments. It accepts any value between $-\infty$ and 1, as a CES function, but for a negative δ it will generate a negative but increasing utility in consumption and leisure. In other words, the range of possible values for the utility is not constrained to only positive values.

Thus, the joint utility function that agents from the same household maximize is

$$\frac{\alpha_1 c^\delta}{\delta} + \frac{(1-\alpha_1) l_1^\delta}{\delta} + \mu[\frac{\alpha_2 c^\delta}{\delta} + \frac{(1-\alpha_2) l_2^\delta}{\delta}] \tag{2.26}$$

Although it would seem more logical to have different deltas for different agents, there exist two reasons for having only one: a) The two agents have different alphas, so they can give completely different weights (preferences) to consumption and leisure, and b) Having only one delta allows us to arrive to a close form solution for the optimal allocation of time[2].

Solving the Model:

After setting the Langragian and taking First Order Conditions (FOC) with respect to c, l_1, l_2 and λ we arrive to a system of four equations with four unknowns:

$$c : (\alpha_1 + \mu\alpha_2) c^{\delta-1} = \lambda \tag{2.27}$$

[2]This model can be solved with different deltas, arriving to a non close form solution. Although with different deltas the model is also able to replicate the inverted C shape, its use would be not clear, because it is not possible to obtain h as a function of only exogenous variables and parameters.

$$l_1 : \frac{(1-\alpha_1)l_1^{\delta-1}}{w_1} = \lambda \tag{2.28}$$

$$l_2 : \frac{\mu(1-\alpha_2)l_2^{\delta-1}}{w_2} = \lambda \tag{2.29}$$

$$\lambda : (1-l_1)w_1 + (1-l_2)w_2 + y = c \tag{2.30}$$

By combining (2.28) and (2.29) we arrive to the conclusion that the ratio of labor prices is equal to the ratio of marginal utilities of labor.

$$\frac{w_1}{w_2} = \frac{(1-\alpha_1)l_1^{\delta-1}}{\mu(1-\alpha_2)l_2^{\delta-1}} \tag{2.31}$$

From (2.31) we find (2.32) and (2.33)

$$l_2 = (\frac{\mu(1-\alpha_2)w_1}{(1-\alpha_1)w_2})^{\frac{1}{1-\delta}} l_1 \tag{2.32}$$

$$l_1 = (\frac{(1-\alpha_1)w_2}{\mu(1-\alpha_2)w_1})^{\frac{1}{1-\delta}} l_2 \tag{2.33}$$

By combining (2.27) to (2.29), and substituting the results in (2.30) we obtain the optimal allocation of time to leisure of both agents, (l_1) and (l_2).

$$l_1 = \frac{w_1 + w_2 + y}{w_1 + (\frac{\mu(1-\alpha_2)}{1-\alpha_1})^{\frac{1}{1-\delta}} (\frac{w_1}{w_2})^{\frac{1}{1-\delta}} w_2 + (\frac{\alpha_1+\mu\alpha_2}{1-\alpha_1})^{\frac{1}{1-\delta}} w_1^{\frac{1}{1-\delta}}} \tag{2.34}$$

$$l_2 = (\frac{\mu(1-\alpha_2)}{1-\alpha_1})^{\frac{1}{1-\delta}} (\frac{w_1}{w_2})^{\frac{1}{1-\delta}} (\frac{w_1 + w_2 + y}{w_1 + (\frac{\mu(1-\alpha_2)}{1-\alpha_1})^{\frac{1}{1-\delta}} (\frac{w_1}{w_2})^{\frac{1}{1-\delta}} w_2 + (\frac{\alpha_1+\mu\alpha_2}{1-\alpha_1})^{\frac{1}{1-\delta}} w_1^{\frac{1}{1-\delta}}}) \tag{2.35}$$

Using the time constraint of each agent we find the optimal allocation of time to work as a function of wages, parameters, and the constant non labor income (y). We also substitute $\frac{1}{1-\delta}$ by σ.

$$h_1 = \frac{(\frac{\mu(1-\alpha_2)}{1-\alpha_1})^{\sigma}(\frac{w_1}{w_2})^{\sigma} w_2 + (\frac{\alpha_1+\mu\alpha_2}{1-\alpha_1})^{\sigma} w_1^{\sigma} - w_2 - y}{w_1 + (\frac{\mu(1-\alpha_2)}{1-\alpha_1})^{\sigma}(\frac{w_1}{w_2})^{\sigma} w_2 + (\frac{\alpha_1+\mu\alpha_2}{1-\alpha_1})^{\sigma} w_1^{\sigma}} \tag{2.36}$$

$$h_2 = \frac{(w_2(1-\alpha_1))^{\sigma}[w_1 + (\frac{\mu(1-\alpha_2)}{1-\alpha_1})^{\sigma}(\frac{w_1}{w_2})^{\sigma} w_2 + (\frac{\alpha_1+\mu\alpha_2}{1-\alpha_1})^{\sigma} w_1^{\sigma}] - [(\mu(1-\alpha_2)w_1)^{\sigma}(w_1+w_2+y)]}{(w_2(1-\alpha_1))^{\sigma}(w_1 + (\frac{\mu(1-\alpha_2)}{1-\alpha_1})^{\sigma}(\frac{w_1}{w_2})^{\sigma} w_2 + (\frac{\alpha_1+\mu\alpha_2}{1-\alpha_1})^{\sigma} w_1^{\sigma}} \tag{2.37}$$

The simulation of this model can be observed on figure 2.1.c.

2.3.1.1 Corner solutions

First agent does not work

The condition needed for agent one to choose not to work is that $l_1 \geq 1$; this happens when the numerator is larger than the denominator on (2.34). Solving the inequality and considering $\frac{1}{1-\delta} = \sigma$ we find the condition, eq (2.38), that makes the first agent not to work.

$$w_1 \leq \frac{(w_2+y)^{\frac{1}{\sigma}}}{[(\frac{\mu(1-\alpha_2)}{1-\alpha_1})^{\sigma} w_2^{1-\sigma} + (\frac{\alpha_1+\mu\alpha_2}{1-\alpha_1})^{\sigma}]^{\frac{1}{\sigma}}} \tag{2.38}$$

Second agent does not work

As for the first agent, the condition that makes the second agent choosing not to work is $l_2 \geq 1$; this happens when the numerator is larger than the denominator on (2.35). Solving the inequality and considering $\frac{1}{1-\delta} = \sigma$ we find the condition, eq (2.39), that makes the second agent not to work.

$$w_2 \leq \frac{(\mu(1-\alpha_2)w_1)(w_1+y)^{\frac{1}{\sigma}}}{[(1-\alpha_1)^{\sigma} w_1 + (\alpha_1+\mu\alpha_2)^{\sigma} w_1^{\sigma}]^{\frac{1}{\sigma}}} \tag{2.39}$$

We can be more specific in the case that the first agent is not working, $l_1 = 1$. Under this condition, by using eq (2.32) we arrive to

$$w_2 \leq \frac{\mu(1-\alpha_2)w_1}{(1-\alpha_1)} \tag{2.40}$$

Thusly, in this case, agent 2 will not work if the weigth given to her utility (μ) is too large, if the value given to her leisure $(1-\alpha_2)$ is relatively speaking large enough compared to the value that agent 1 gives to his own leisure $(1-\alpha_1)$, and if the wage of the first agent is large enough relative to her wage. If μ is very small, or if α_2 close to 1, agent 2 will work at almost any wage.

First agent works full time

From (2.33) we can observe that agent 1 works full time, $l_1 = 0$, when the value he gives to leisure $(1-\alpha_1)$ is zero, when the weight given to the utility of the second agent (μ) is infinite, when the wage of the second agent is too small relative to his own wage, and when the second agent works full time.

Second agent works full time

From (2.32) we observe that agent 2 works full time when the weight given to her utility (μ) is zero, when she does not value leisure $(1-\alpha_2)$, when the wage of the first agent is too small relative to her wage, and when the first agent works full time.

2.3.1.2 The individual as a special case of the household model

From eq (2.36) we can observe that our individual model, presented in the following pages, is a special case of our household model when the weight given to the utility of the second agent is zero. When $\mu = 0$, eq (2.36) collapses to

$$h_1 = \frac{(\frac{\alpha_1}{1-\alpha_1})^\sigma w_1^\sigma - w_2 - y}{w_1 + (\frac{\alpha_1}{1-\alpha_1})^\sigma w_1^\sigma} \tag{2.41}$$

This is exactly the same labor supply of our individual model, with the only exception that now the non-labor income of agent 1 is $w_2 + y$, instead of only y. Given that the labor income of the second agent cannot be considered as part of the labor income of the first agent, the last statement is true.

2.3.2 The Individual Forward Falling, Negatively Sloped and Backward Bending Static Structural Model

In this and the next subsection we present the second and third special cases of the general model. We simplify the general model by defining $G \equiv 0$ and $\mu \equiv 0$, thus, the model collapses to an individual model -see section 2.3.1.2-.

We generate the negative slope at low wages thanks to the inclusion of a minimum survival level of consumption in the utility function. This characteristic provides the model with substantial flexibility. If the minimum survival level of consumption is larger than the non-labor income, it generates a negatively-sloped LSC — figure 2.2.c —, if it is smaller, it generates a backward-bending LSC — figure 2.2.b —, and, if we let δ have a positive instead of a negative value, it generates a forward falling LSC — figure 2.2.d —.

[Figure 2.2 here]

In this static model the agent receives utility from leisure and consumption, she faces time, budget, and a minimum level of consumption constraints.

The agent maximizes her utility

$$max[U(l, c - c^*)] \tag{2.42}$$

subject to

$$h + l = 1 \tag{2.43}$$

$$hw + y \geq c \tag{2.44}$$

where l and c state for leisure and consumption respectively, h represents working time, c^*corresponds to the minimum survival level of consumption required by the agent, and y is non-labor income. The price of the consumption good is normalized to one and the total amount of time that the agent can distribute between leisure and working is one.

Substituting (2.43) in (2.44) we get the final budget constraint

$$(1-l)w+y \geq c \tag{2.45}$$

We require a Constant Elasticity of Substitution (CES) utility function.

$$U=[\alpha(c-c^*)^{\delta}+(1-\alpha)l^{\delta}]^{1/\delta} \tag{2.46}$$

Solving the Model:
After setting the Langragian and taking First Order Conditions (FOC) with respect to the choice variables and the multiplier, we arrive to a system of three equations with three unknowns. By combining them, we find the usual conclusion that the marginal rate of substitution (MRS) is equal to the ratio of prices, eq. (2.47), as well as the optimal allocation of time to leisure, eq. (2.48)

$$\frac{1-\alpha}{\alpha}\left(\frac{c-c^*}{l}\right)^{1-\delta}=w \tag{2.47}$$

$$l=\frac{w+y-c^*}{w+\left(\frac{\alpha w}{1-\alpha}\right)^{\frac{1}{1-\delta}}} \tag{2.48}$$

By combining the time constraint with the last result we find the optimal allocation for working time.

$$h=\frac{\left(\frac{\alpha}{1-\alpha}\right)^{\frac{1}{1-\delta}}w^{\frac{1}{1-\delta}}-y+c^*}{w+\left(\frac{\alpha}{1-\alpha}\right)^{\frac{1}{1-\delta}}w^{\frac{1}{1-\delta}}} \tag{2.49}$$

Given that the Elasticity of Substitution (σ) for a CES utility function is $\frac{1}{1-\delta}$, we can express equation (2.49) as

$$h = \frac{(\frac{\alpha}{1-\alpha})^{\sigma} w^{\sigma} - y + c^{*}}{w + (\frac{\alpha}{1-\alpha})^{\sigma} w^{\sigma}} \tag{2.50}$$

We present the proofs of the negatively-sloped and forward falling shapes that this model is able to generate.

2.3.2.1 Proof of a negatively-sloped when $\delta < 0$

Simplify the model defining A and take the first derivative with respect to the wage.

$$A \equiv (\frac{\alpha}{1-\alpha})^{\sigma} \tag{2.51}$$

$$\frac{\partial h}{\partial w} = \frac{A\sigma w^{\sigma-1}(w + Aw^{\sigma}) - (Aw^{\sigma} - y + c*)(1 + A\sigma w^{\sigma-1})}{(w + Aw^{\sigma})^2} \tag{2.52}$$

Simplify the previous result and rewrite it as

$$\frac{\partial h}{\partial w} = \frac{Aw^{\sigma}(\sigma - 1) + (1 + A\sigma w^{\sigma-1})(y - c^{*})}{(w + Aw^{\sigma})^2} \tag{2.53}$$

Given that the denominator of the previous derivative is positive we can focus our attention in the numerator. Define it equal to $\phi(w)$

$$\phi(w) \equiv Aw^{\sigma}(\sigma - 1) + (1 + A\sigma w^{\sigma-1})(y - c^{*}) \tag{2.54}$$

$$-\infty < \delta < 0 \quad and \quad \sigma = \frac{1}{1-\delta} \quad \Rightarrow \quad 0 < \sigma < 1$$

Because $\sigma - 1$ and $y - c^{*}$ are negative, the first and second terms of eq (2.54) are both negative, so the previous derivative is negative. We have a decreasing function that never changes the sign of its slope, that is, a negatively-sloped LSC.

2.3.2.2 Proof of a forward falling LSC when $0 < \delta < 1$

$$0 < \delta < 1 \qquad \Rightarrow \quad 1 < \sigma < \infty$$

Evaluate eq (2.54) in the limits, remember we are considering $y < c^*$

$$\lim_{w \to 0} \phi(w) < 0 \qquad \lim_{w \to +\infty} \phi(w) > 0 \tag{2.55}$$

Our LSC exhibits a negative slope at very low wages and a positive one at very high wages. We can be more specific

$$\phi'(w) = (\sigma - 1)\sigma A w^{(\sigma-1)} + (y - c^*)(\sigma - 1)A\sigma w^{(\sigma-2)} \tag{2.56}$$

Simplify and rewrite it as

$$\phi'(w) = A\sigma(\sigma - 1)w^{(\sigma-2)}[w + (y - c^*)] \tag{2.57}$$

2.3.2.3 Corner solutions of the forward falling LSC

Using (2.51) we can rewrite (2.50) as

$$h = \frac{Aw^{\sigma} - y + c^*}{w + Aw^{\sigma}} \tag{2.58}$$

As in the backward bending case, given that the working time cannot be negative, whenever $h \leq 0$ we will have $h = 0$, and, because the agent's total amount of time is 1, for $h \geq 1$ we will have $h = 1$.

Not working case (h=0)

Given that the denominator in (2.58) is positive, the only way that h can be 0 or negative is if $Aw^{\sigma} - y + c^* \leq 0$. Solving for w we get

$$w \leq (\frac{y - c^*}{A})^{\frac{1}{\sigma}} \tag{2.59}$$

As far as the minimum consumption $(c^*) >$ non labor income (y), $y - c^* < 0$, so for observing $h \leq 0$ we would need a negative w, something that does not exist, thus h will always be positive.

Not leisure case (h=1)

For $h \geq 1$ in (2.58) we need $c^* - y \geq w$, that is, we need the agent's net need of labor income to be equal or more than the full labor income (w). Labor income = hw, where $0 \leq h \leq 1$. [3]

2.3.3 The Simplest Individual Backward Bending Static Structural Model

The last special case of the general model is presented in this subsection. It is simplified by defining $\mu \equiv 0$, $G \equiv 0$, and $c^* \equiv 0$. This individual static structural model is able to generate the individual backward bending LSC that we estimated in the American case, presented in chapter III.

We present the simplest individual static structural model able to generate a backward bending LSC. It only requires one simple assumption, leisure and consumption are gross complements. By way of explanation, the path that allows us to generate a backward bending LSC is focusing our attention on the idea that leisure and consumption should be more complements than substitutes. Put differently, there is no point in being so willing to substitute leisure for consumption once you already have a high level of labor income. So, if we consider the Cobb-Douglas utility function as the border -where the share of income spent in each argument is constant independently of prices-, we should have a utility function that lies in the area between the Cobb-Douglas and the perfect complement cases, where the share of income spent in one argument increases after an increment in its price. Figure 2.2.a corresponds to the simulation of this model.

In this static model the agent receives utility from leisure and consumption, and faces time and budget constraints.

[3] Notice that for estimating the labor income, there is no need for $h > 1$, that is, the agent's full labor income can be equal to w (1*w) if the time units of the wage -say 1 hour- is equal to the time units of the consumption and non labor income -say consumption and non labor income by hour-.

The agent maximizes her own utility

$$max[U(l,c)] \tag{2.60}$$

subject to

$$h+l=1 \tag{2.61}$$

$$hw+y \geq c \tag{2.62}$$

Substituting (2.61) in (2.62) we get the final budget constraint

$$(1-l)w+y \geq c \tag{2.63}$$

We can use any utility function that belongs to a subset of the Constant Elasticity of Substitution (CES) utility functions where δ is constrained to be negative. When $\delta = 0$ we obtain the Cobb-Douglas utility function, where not only the elasticity of substitution is constant but also the share of income spent in each argument is constant after a change of prices. Constraining δ to be negative provokes the arguments in the utility function to be gross complements and the utility function to lie between the Cobb-Douglas and the perfect complements utility function. So, when we increase the price of an argument, the share of income spent in the same also increases.

$$U = [\alpha c^{\delta} + (1-\alpha)l^{\delta}]^{1/\delta} \quad where \quad -\infty < \delta < 0 \tag{2.64}$$

Solving the Model:

After setting the Langragian and taking First Order Conditions (FOC) with respect to c, l and λ, we arrive to a system of three equations with three unknowns. By combining them, we find the usual conclusion that the marginal rate of substitution (MRS) is equal to the ratio of prices, eq. (2.65), as well as the optimal allocation of time to leisure, eq. (2.66)

$$\frac{1-\alpha}{\alpha}\left(\frac{c}{l}\right)^{1-\delta} = w \tag{2.65}$$

$$l = \frac{w+y}{w+(\frac{\alpha w}{1-\alpha})^{\frac{1}{1-\delta}}} \tag{2.66}$$

Combining this last result with the time constraint, eq. (2.61), we find the optimal allocation of time to work as a function of the wage, parameters, and the constant non labor income (y).

$$h = \frac{(\frac{\alpha}{1-\alpha})^{\frac{1}{1-\delta}} w^{\frac{1}{1-\delta}} - y}{w+(\frac{\alpha}{1-\alpha})^{\frac{1}{1-\delta}} w^{\frac{1}{1-\delta}}} \tag{2.67}$$

Given that the Elasticity of Substitution (σ) for a CES utility function is $\frac{1}{1-\delta}$ we can express equation (2.67) as

$$h = \frac{(\frac{\alpha}{1-\alpha})^{\sigma} w^{\sigma} - y}{w+(\frac{\alpha}{1-\alpha})^{\sigma} w^{\sigma}} \tag{2.68}$$

2.3.3.1 Proof of backward bending LSC

Simplify the model defining A, and, take the first derivative with respect to the wage.

$$A \equiv (\frac{\alpha}{1-\alpha})^{\sigma} \tag{2.69}$$

$$\frac{\partial h}{\partial w} = \frac{A\sigma w^{\sigma-1}(w+Aw^{\sigma}) - (Aw^{\sigma}-y)(1+A\sigma w^{\sigma-1})}{(w+Aw^{\sigma})^2} \tag{2.70}$$

Simplify the previous result and rewrite it as

$$\frac{\partial h}{\partial w} = \frac{Aw^{\sigma}(\sigma - 1) + y + yA\sigma w^{\sigma - 1}}{(w + Aw^{\sigma})^2} \tag{2.71}$$

Given that the denominator of the previous derivative is positive we can focus our attention in the numerator. Define it equal to $\phi(w)$

$$\phi(w) \equiv Aw^{\sigma}(\sigma - 1) + y + yA\sigma w^{\sigma - 1} \tag{2.72}$$

$$\textit{given that} \quad -\infty < \delta < 0 \quad \textit{and} \quad \sigma = \frac{1}{1-\delta} \quad \Rightarrow \quad 0 < \sigma < 1$$

Evaluate the function in the limits

$$\lim_{w \to 0} \phi(w) > 0 \qquad \lim_{w \to +\infty} \phi(w) < 0 \tag{2.73}$$

Once we know the function presents a positive slope at low wages and a negative one at high wages, it is required to prove that the function changes its slope only once.

$$\phi'(w) = A(\sigma - 1)\sigma w^{(\sigma - 1)} + yA\sigma(\sigma - 1)w^{(\sigma - 2)} \tag{2.74}$$

Simplify and rewrite it as

$$\phi'(w) = A\sigma(\sigma - 1)(w^{(\sigma - 1)} + yw^{(\sigma - 2)}) \tag{2.75}$$

Because $(\sigma - 1)$ is negative, the last result states that $\phi(w)$ is a decreasing function, meaning that it changes its slope from positive to negative at only one point. We can observe the simulation of this model in figure 2.2.a.

2.3.3.2 Corner solutions

Using (2.69) we can rewrite (2.68) as

$$h = \frac{Aw^{\sigma} - y}{w + Aw^{\sigma}} \tag{2.76}$$

Given that the working time cannot be negative, whenever $h \leq 0$ we will have $h = 0$, and, because the agent's total amount of time is 1, for $h \geq 1$ we will have $h = 1$.

Not working case (h=0)

Given that the denominator in (2.76) is positive, the only way for h to be 0 or negative is if $Aw^{\sigma} - y \leq 0$ so, solving for w we get

$$w \leq (\frac{y}{A})^{\frac{1}{\sigma}} \tag{2.77}$$

If condition (2.77) holds the agent will not work.

Not leisure case (h=1)

In (2.76) the numerator is Aw^{σ} - some positive number (y) and the denominator is Aw^{σ} + some positive number (w) $\Rightarrow$ the denominator $>$ numerator $\Rightarrow$ h is always smaller than 1. However, we can find the limit when h approaches 1. Rewrite (2.68) as

$$h = \frac{(\frac{\alpha}{1-\alpha})^{\sigma} w^{\sigma}}{w + (\frac{\alpha}{1-\alpha})^{\sigma} w^{\sigma}} - \frac{y}{w + (\frac{\alpha}{1-\alpha})^{\sigma} w^{\sigma}} \tag{2.78}$$

In (2.78) we observe that for a large enough α (the weight given to consumption) h is close to 1. This is because when α is close to 1 $\Rightarrow \frac{\alpha}{1-\alpha}$ is a large number, so the second term in (2.78) will be 0 and the first term will be close to 1, regardless of the value of w.

2.4 Figures

Figure 2.1 Simulation of the general household static structural model

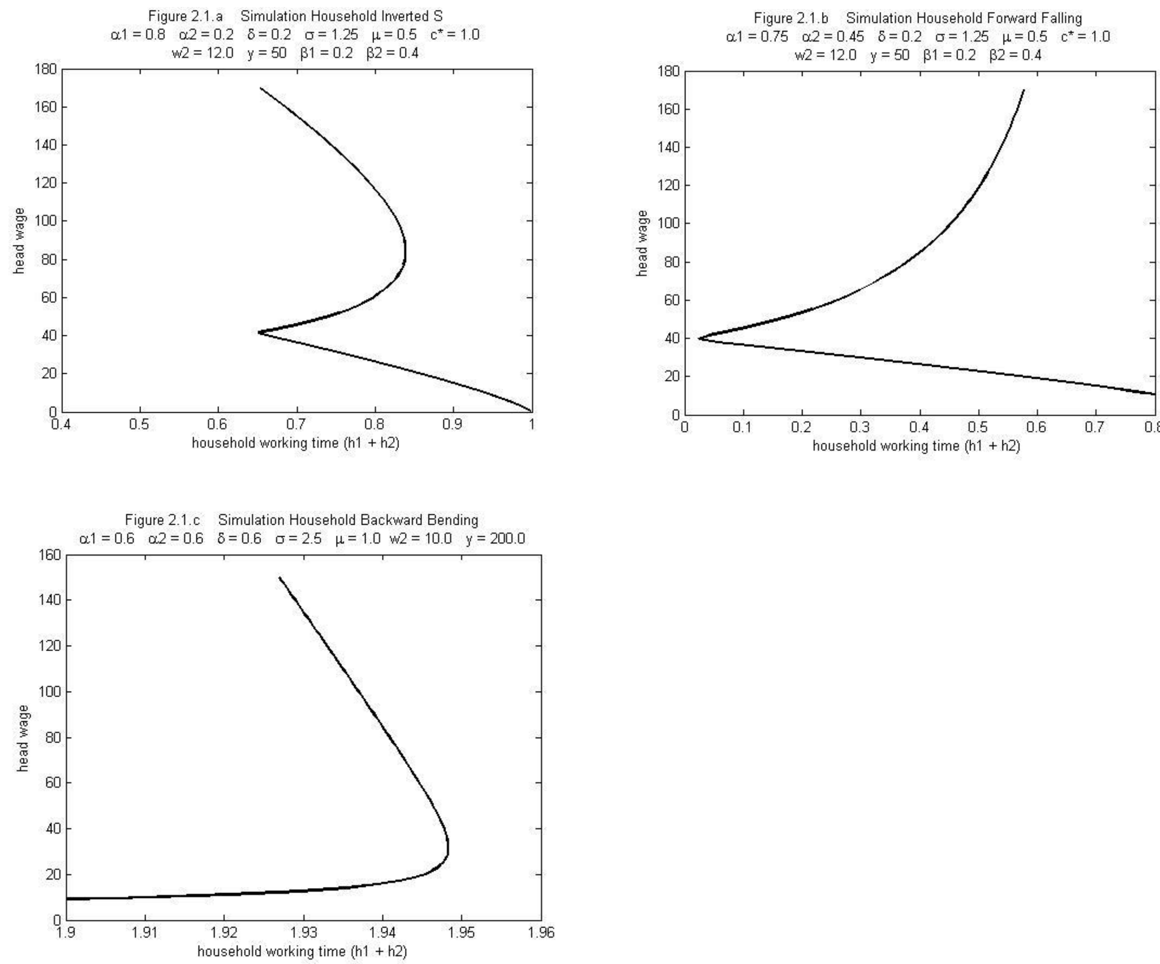
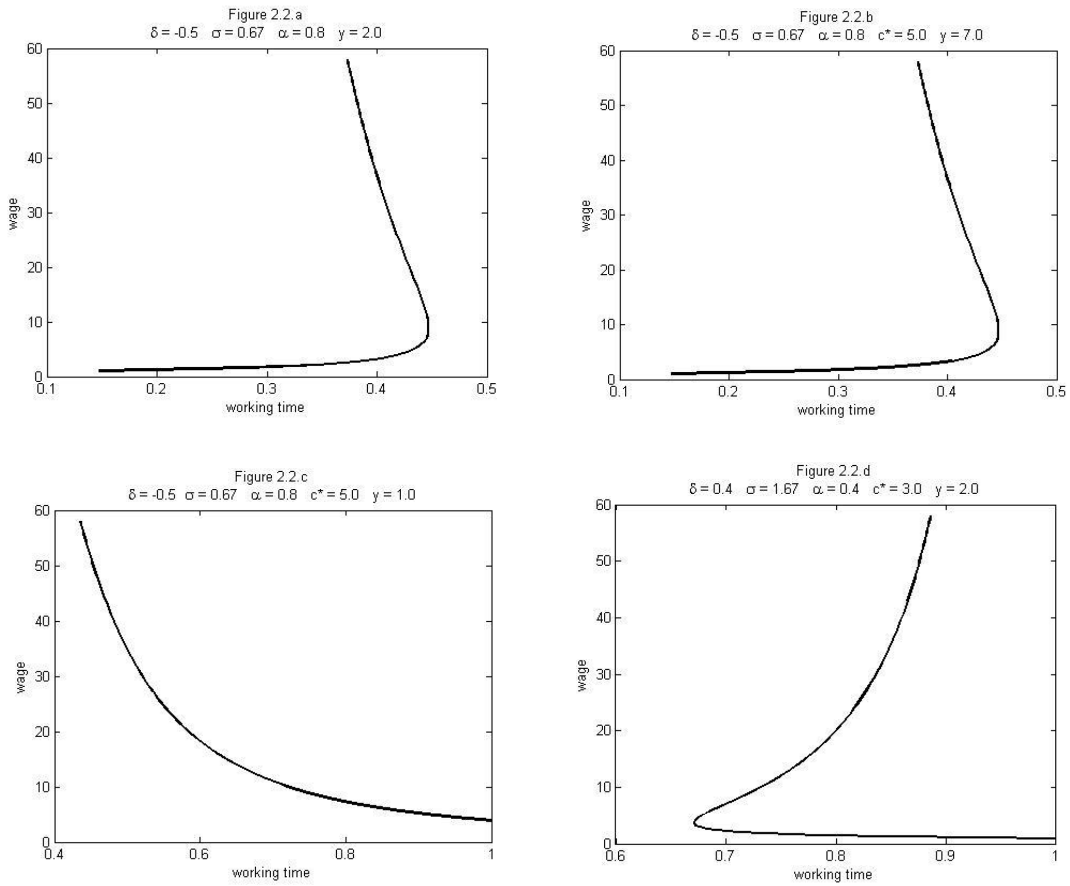


Figure 2.2 Simulation of some special cases: individual static structural models



Chapter 3

Individual Backward Bending and Forward Falling Labor Supply Curves: US and Mexico

3.1 Introduction

We study and compare the individual labor supply of a developing Mexican versus a developed American economy. Important differences in their labor markets do not allow us to assume a priori the same labor supply curve (LSC) shape. The main difference, upon which we base our study, is the wage range faced by their agents.

Our results suggest that, regardless of the underlying assumption of homogeneous or heterogeneous units of labor, that is, disaggregating or not the labor market by levels of education, the individual American and Mexican labor supply curves exhibit a backward bending (inverted C) and forward falling (C) shapes respectively[1], implying the existence of a survival constraint at very low wages, not observed in the more developed American economy. Considering both economies together, an inverted S shape is observed.

If only a linear functional form is allowed, a constant positive and negative slopes

[1] Our qualitative results are the same by considering or not sample selection bias in the estimation.

are supported by the American and Mexican data respectively. In the American case, this slope increases at labor markets with more years of education, supporting (given the correlation between education and wages) an overall backward bending LSC. In the Mexican case, this result supports the conclusion of a negative slope at low wages.

More precisely, considering working hours as a function of wages, the backward bending LSC observed in the American economy corresponds to the plot of the function in which the domain contains the highest range of argument (wage) values. Once we extend the domain to values close to zero -the developing case- we observe a forward falling LSC. When agents of both economies face the same wage, they offer a similar number of working hours. Considering both wage ranges together, an inverted S shaped LSC is generated.

We propose -in chapter 2- static structural models, which generate optimal reaction functions regarding the time allocated to work similar to the observed LSC of each economy. These models demonstrate that the agents' behavior underlying the backward bending, as well as the forward falling LSC, constitutes an optimal response of agents in the absence or presence of a survival constraint.

In the economic literature, the theoretical individual backward bending LSC is broadly assumed in labor text books. Nevertheless, it still faces some weakness issues. First, by concluding that the observed LSC presents just a positive slope all along it, Barzel (1973), Lundberg (1985), the existent empirical research does not support it[2]. Second, only two papers propose theoretical structural models able to generate it[3]: Hanoch (1965) assuming a double exponential utility function -where the backward bending shape can be generated only for certain consumption/leisure ratios-, and Barzel(1973) using a minimum amount of leisure and consumption constraints.

In the previous discussion, this paper collaborates by presenting empirical evidence of a backward bending shape in a developed economy and by providing the

[2]It is worth noticing that given that the substitution and income effect can dominate each other, the neoclassical model of labor-leisure choice does not conclude any specific shape for the LSC.

[3]There exists a third one, Lin (2003), that claims its model is able to generate it, but its results are still under consideration.

simplest static structural model able to generate it.

The idea of a negatively-sloped LSC in developing societies has been in the economic literature for several years, Boeke (1953), Berg (1961), Shultz (1964), Lipton (1983). Intuitively speaking it has been explained by arguing some irrational behavior, such as the existence of limited aspirations or wants, or the existence of a target income, that provokes people facing low wages to work less when wages increase. So far, no formal structural model has been presented that support these ideas.

By presenting empirical evidence of the existence of a forward falling LSC, at the developing Mexican economy, as well as the structural model that support it, this dissertation demonstrates that the negative slope only exists at very low wages, not observed in developed societies, where agents face a survival constraint that makes them work more when wages decrease. Once agents of both economies face similar wages, they offer similar working hours.

Our results suggest that, considering two economies with different level of development together, or more specifically speaking, different wage ranges, an international inverted S LSC is observed. Although this result is new in the economic literature, the intuitive discussion of the possibility of observing this shape in a single national economy is not new, Sharif (2000), Dessing (2001), and Nakamura and Murayama (2010)[4].

Our results have non-trivial economic policy implications on the optimal minimum wage and public education - poverty cycles in the Mexican economy. They also affect the optimal labor-income tax policy in the American economy.

Additionally, we propose an alternative way of analyzing the labor market, by presenting a moving average of the locus of equilibria by deciles of wages. This technique provides us with the observed average number of working hours at different wages, regardless of the supply and demand curve shapes. In other words,

[4]Dessing and Sharif discuss the economic intuition of an inverted S LSC and present empirical evidence of just a negatively-sloped LSC. Dessing tries to formalize the intuition by presenting a family model without specifying a utility function. By assuming a decreassing elasticity of substitution and the use of a shift in the utility function, Nakamura and Murayama try to model this shape.

the obtained plots provide the average final result at each wage decile after the interaction of supply and demand curves.

Section 3.2 describes the datasets we use. Section 3.3 presents an alternative way for analyzing the labor market. Section 3.4 presents the estimated LSCs for the American and Mexican economies. In section 3.5 we discuss some economic implications of the observed shapes. Section 3.6 concludes. Section 3.7 contains tables and figures.

3.2 The Data

The estimated LSCs presented in this paper were generated using two datasets, both of them publicly available on the internet. For the American case we use NLSY79 and for the Mexican case we use ENIGH2010.[5]

NLSY79 is a panel dataset, while, ENIGH is a survey realized every two years on different households. This is the reason why our research is static.

3.2.1 The American Dataset

The National Longitudinal Survey of Youth 1979 (NLSY79) dataset is an American representative sample of 12,686 persons who were between 14 and 22 years old in 1979, when they were surveyed for the first time. This survey is conducted by the US Bureau of Labor Statistics. Interviews were conducted every year from 1979 to 1994, after which they have taken place every two years.

3.2.2 The Mexican Dataset

Encuesta Nacional de Ingresos y Gastos de los Hogares 2010 (ENIGH2010) - Income and Expenditure Household National Survey 2010-. It is a national representative household survey, generated every two years by the Mexican National Institute of Statistics, Geography and Information (INEGI).

[5] Publicly available at http://www.inegi.org.mx/est/contenidos/Proyectos/Encuestas/Hogares/regulares/Enigh/default.aspx

ENIGH2010 includes 27,087 surveyed households; once each one is multiplied by its respective expansion factor, it represents a total of 28,513,038 households, including a total of 112,739,699 persons, that is, the total Mexican population.
Table 3.1, generated with the above discussed datasets, presents average wages by certain levels of education and by industries. As we can observe, the wage ranges are different between these two economies; more precisely, for this set of heterogeneous labor markets, the highest Mexican average wage does not reach the lowest American average one.

[Table 3.1 here]

3.3 An Alternative Way for Analyzing the Labor Market

We propose an alternative way for analyzing the labor market. We calculate moving averages of wages and working hours by deciles of wages. Plotting the results provides us with a trace of the average locus of equilibria at different deciles of wages. This methodology gives us the final result in the labor market, after the interaction of the supply and demand curves, and regardless of the shape of the last ones.
The methodology for drawing these plots was to aggregate the dataset by deciles of wages, so the lowest point corresponding to each country belongs to the lowest wage decile, the second to the second lowest wage decile, and so on, the highest point representing the population with the largest wage. By way of explanation, each of the 10 points represents 10 percent of the population and corresponds to the average wage on the y axis and the weekly working hours respectively on the x axis.

[Figure 3.1 here]

3.4 Estimated Labor Supply Curves

In this section we present our results of estimating the American and Mexican LSCs. In doing so, we consider both homogeneous and heterogeneous units of labor. By way of explanation, the standard assumption is considering homogeneous units of labor, where workers are considered able to perform the duties of any job, but with different efficiency levels. With this, it is possible to estimate a LSC includying all individuals in a given dataset.

We perform our heterogeneous analysis by disaggregating the dataset by levels of education, so that individuals with different levels of education belong to different labor markets. This last approach is more realistic in the sense that for certain jobs more years of education are required.

Given the endogeneity of wages in the labor market, the use of Instrumental Variables (IV) is required. The perfect instrument would be a variable highly correlated with the wage but not included in the error term of the working hours equation at the individual level. Unfortunately, every variable has certain degree of endogeneity and correlation with other variables, making the perfect instrument inexistent. Despite this fact, it is possible to find acceptable instrument variables with different levels of endogeneity, so its use in separate regressions allows the researcher to verify the consistency of the results.

It is also worth noting that although it is possible to check the correlation between the endogenous regressor and the IV, the validity of the IV is not. Tests of overidentifying restrictions -as Sargan test-, are usually interpreted as tests for checking the validity of instruments. This idea is misleading (Deaton 2010) (Parente and Santos Silva 2011), because ”The tests check the coherency of the instruments rather than their validity” [6].

Some aspects of our methodology and results worth being pointed out are: a) We propose a set of IV for both economies, obtaining similar results using them separately. b) All our regressions were estimated using Two Step Least Squares (2SLS), in the first step the wage is estimated and in the second one the results are

[6] Parente and Santos Silva 2011.

used for estimating working hours. c) Considering demographic characteristics other than sex, as rural-urban and region, is relevant in Mexico, but its inclusion in the American regressions results statistically non-significative. We believe the reason is that there exist huge differences on wages among regions in Mexico, but American wages are, relatively speaking, more homogeneous among urban and rural areas and regions. Maybe it is enough to say that, according to official statistics, the difference on GDP per capita between Mexico city and the poorest states in the south of the country -Oaxaca and Chiapas- was around 500.0% by 2005. d) Our qualitative results demonstrate to be consistent regardless of the inclusion of corner solutions or not. All the estimations about the quadratic functional form[7] are presented considering and not sample selection bias.

3.4.1 Estimated American Labor Supply Curves

For the American case we use as IV the size of the firm where the agent — employee — works (Size F 50-500H and Size F more 500H), the condition if the firm has more than one location (MOneLoc), the median and the mean of the economy wage (WEconMed and WEconMean), as well as the square of the mean of the economy wage (WEconMeansq) that corresponds to the level of education and industry for each specific agent.

The intuition of the last instruments consists in the fact that the market wage should be highly correlated with the individual wage, but the number of working hours an agent offers only depends on his own wage, meaning that it is not in the error term at the individual level. Also, if the mean or median of the economy wage are correlated with the wage of the agent, then the square of the former should be also correlated with the square of the latter. The last IV allows us to estimate a quadratic functional form.

In the regressions where sample selection bias is considered (tables 3.2.2, 3.3.2 and 3.4.2) the variables Size F 50-500H, Size F more 500H and MOneLoc are not included because we are considering both agents that work and do not work

[7]The linear functional form is not that relevant for the conclusions of this dissertation, thusly we do not present its estimation considering sample selection bias.

-corner solutions-, so these variables are missing for the last ones[8]. For those observations that correspond to a not working case -corner solution-, the variables WEconMed, WEconMean and WEconMeansq correspond only to the level of education but not to a specific industry, given that a corresponding industry does not exist.

Tables 3.2.1 and 3.2.2 show the results of considering homogeneous units of labor. The results of seven econometric regressions, with different combinations of IV, are displayed[9]. As we can observe, the backward bending LSC is supported by the fact that $\hat{w}$ and $\hat{w}^2$ present a positive and negative sign respectively, both of them are statistically significant at 1 % in most cases.

[Tables 3.2.1 and 3.2.2 here]

The results of estimating the LSC for the heterogeneous cases are presented in tables 3.3.1 to 3.6, where E $\leq$ HS means education no more than high school — at most 12 years of education —, E in HS states for education in high school — not less than 10 and no more than 12 years of education —, E = HS means graduated from high school — exactly 12 years of education —, E in C refers to education in college — no more than 16 and not less than 13 years of education—, E = C states for graduated from college — exactly 16 years of education—, and E in GS means education in graduate school — not less than 17 years of education —.

For consistency, regarding the heterogeneous units of labor case, tables 3.3.1 to 3.6 and 3.8.1 to 3.11, refer to the same levels of education with different IV and exogenous variables. Tables 3.3.1 to 3.6 refer to the American and tables 3.8.1 to 3.11 to the Mexican case.

[8]In the Heckman selection model the endogenous variable is allowed to be missing but not the exogenous one.

[9]Given that the regressions that consider sample selection bias do not include SizeFirm500, SizaFirm501 and MOneLoc, regression 3 becomes identical to regression 2 and regression 7 to regression 6, so they are not included in table 3.2.2.

[Tables 3.3.1 to 3.6 here]

As we can observe in tables 3.3.1 to 3.4.2, if a quadratic functional form is estimated, the data supports a backward bending shape, that is, the coefficient of $\hat{w}$ is positive and $\hat{w}^2$ is negative. If instead of a quadratic, a linear functional form is estimated, tables 3.5 and 3.6, a positive slope is supported by the data. Nevertheless, with more years of education, the positive slope becomes non-significative, table 3.5, or changes to a negative slope, table 3.6, supporting the overall idea of a backward bending shape.

3.4.2 Estimated Mexican Labor Supply Curves

Tables 3.7.1 and 3.7.2., this last one considering sample selection bias, contain the regressions regarding the homogeneous units of labor case. As we can observe, the coefficient of $\hat{w}$ is negative and $\hat{w}^2$ is positive, all of them statistically significant at 1%, suggesting the existence of a forward falling (C) LSC.
The heterogeneous units of labor cases are presented in tables 3.8.1 to 3.11. As we can observe in tables 3.8.1 to 3.9.2, if a quadratic functional form is estimated, regardless of whether we consider sample selection bias or not, the data supports also a forward falling shape, that is, the coefficient of $\hat{w}$ is negative and $\hat{w}^2$ is positive. If instead of a quadratic, a linear functional form is estimated, tables 3.10 and 3.11, a negative slope is supported by the data. That is, in both cases, a negatively sloped LSC at low wages is supported by the data in the Mexican case. As way of explanation, on table 3.10 the IV is the median of the wage in the Mexican economy of agents that have the same number of years of education and work for the same industry — WageEconMedi —. While in table 3.11 the IV consists in the type of the firm for which the employee works — private, governmental or familiar —. In both sets of regressions we included 4 exogenous variables: Urban-rural area (Urb-Rur), Region -south, central or north-, sex, and a proxy for working or not in the formal sector (Contract).

[Tables 3.7.1 to 3.11 here]

In figure 3.2 we plot the results of estimating the LSCs, for both the Mexican and the American economies, in the homogeneous units of labor case. In this plot it is possible to observe that considering both economies together an inverted S LSC is suggested.

[Figure 3.2 here]

3.5 Economic Implications of the Estimated LSCs

Our results have non-trivial implications on optimal economic policies:

3.5.1 Economic Implications of the Estimated American LSCs

The fact that the observed American individual LSC presents a backward bending shape, in both homogeneous and heterogeneous units of labor cases, instead of only a positive slope as most of the empirical literature suggests, has policy implications. If the target consists in incentivating the population with the highest wages to work more, then the optimal policy under a constant positive slope LSC requires to decrease their labor taxes, while if the observed LSC presents a backward bending shape the optimal policy would be to increase these taxes.

3.5.2 Economic Implications of the Estimated Mexican LSCs

The differences in optimal economic policies between a positive and a negatively-sloped LSC are not trivial, and some issues requires aditional research: In order to reduce the unemployment rate, the Minimum Wage (MW) should be decreased with a positively-sloped LSC -the low section of a backward bending LSC-. While the optimal policy is not clear with a negatively-sloped LSC -the low section of a forward falling LSC-, considering that we arrive to a multiple equilibria, where the supply is to the right of the demand.

So far it is enough to say that, since the Mexican observed LSC is not the backward bending LSC assumed by the Mexican government, the labor policy regarding the MW during the last decades -to reduce the real MW in order to reduce the unemployment rate- is not necessarily the optimal one[10]. Aditional research is required in order to define the optimal policy under a forward falling LSC.
Figure 3.3.a shows the optimal policy considering a backward bending LSC; if the Minimum Wage is on level D, the corresponding unempolyment is the difference between B and A, so if the MW is reduced to D' the corresponding level of unemployment is reduced -given that the MWs are above the intersection of the demand and supply labor curves, that is, the equilibrium point-, to the horizontal distance between B' and A'. Nevertheless, the optimal policy could be the opposite under a negatively-sloped LSC, as we can see on figure 3.3.b; if the level of the MW is D the corresponding unemployment is the horizontal distance between B and A, if the MW is reduced to D' the unemployment is increased, achieving a level equal to the horizontal line between B' and A'.

[Figure 3.3 here]

Another fact that we would like to point out, eventhough it is out of the scope of this paper, deals with the fact that if the MW is considered the benchmark in the labor market, and because of that a large fraction of wages are set as multiples of the MW (Fairris, Popli and Zepeda 2008) then a reduction of the MW would probably increase the unemployment not only of those who earn one MW but also of all those workers who earn a multiple of the MW.
Our results also add a time constraint, when real wages are decreased, for attending school to individuals that work and study at the same time, exacerbating poverty cycles.

[10] The economic theory states that if the MW is set below the equilibrium in a competitive market it has no effect on wages, nevertheless the official Mexican statistics shows that an important fraction of the Mexican population earns exactly one minimum wage.

3.6 Conclusions

In this chapter we estimated and compared the individual LSC shapes of the American -developed- and Mexican -developing- economies, discussed some of their economic implications, and proposed an alternative way for analyzing the labor market.

Our results suggest that under both the standard assumption of homogeneous units of labor as well as under heterogeneous units of labor, and regardless of whether we consider sample selection bias or not, the individual developed -American- LSC presents a backward bending shape. If just a linear functional form is allowed in the estimation, then a positive slope is supported by the data. Nevertheless, this slope increases at labor markets with more years of education, supporting (given the correlation between education and wages) an overall backward bending LSC. For the Mexican case, considering and not sample selection bias, homogeneous and heterogeneous cases exhibit forward falling labor supply curves, and if just a linear functional form is allowed in the estimation, a negative slope is supported by the data, implying the existence, in all cases, of a survival constraint at low wages, not observed in developed economies. Considering these two economies with different level of development together, or more specifically speaking, with different wage ranges, an international inverted S LSC is observed.

Our results have non-trivial implications on optimal economic policies. In order to reduce the unemployment rate, the minimum wage (MW) should be decreased considering a backward bending shape, while the optimal policy is not necessarily the same considering a forward falling shape; further research is required in this issue.

When real wages decrease, a forward falling LSC also adds a time constraint for attending school to individuals that work and study at the same time, so, to provide the population with free public education -which is the Mexican policy- is not enough to break poverty cycles.

For the American case, if the target consists in incentivizing the population with the highest wages to work more, then the optimal policy under a constant positive slope LSC requires to decrease labor-income taxes, while for the backward bending shape the optimal policy would be to increase these taxes.

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3.7 Tables and Figures

Table 3.1 Summary statistics. Average wages by level of education and industry. Mexico and United States

	Edu <= High School				Graduated in High Sch.				Edu in college				Edu in Graduate Sch.			
Industry	MEX		US		MEX		US		MEX		US		MEX		US	
	w	h	w	h	w	h	w	h	w	h	w	h	w	h	w	h
Average	***1.6***	***43.7***	***19.1***	***41.8***	***2.1***	***46.8***	***19.6***	***42.1***	***3.7***	***42.1***	***31.8***	***42.5***	***5.9***	***42.8***	***45.3***	***44.8***
Agriculture, Forestry, Fishing, Hun	1.2	37.2	18.1	51.6	1.6	39.7	13.6	55.1	3.8	38.3	15.8	49.0	5.2	43.5	24.3	45.1
Mining	2.7	56.3	23.4	57.4	3.0	62.7	24.2	56.7	4.8	57.8	29.8	49.8	6.7	62.6	150.2	40.0
Utilities	2.6	44.5	29.0	43.3	2.5	42.4	30.2	42.3	4.1	44.0	36.9	41.5	5.1	47.0	35.3	42.8
Construction	1.4	48.8	20.4	43.2	1.8	49.6	22.1	43.1	3.6	47.9	28.9	46.3	5.1	51.3	233.8	43.0
Manufacturing	1.5	44.8	24.2	44.1	1.8	47.5	22.1	44.2	2.6	46.3	33.8	44.8	5.1	50.0	63.2	46.5
Wholesale Trade	1.5	53.4	18.8	43.8	1.8	54.7	20.7	43.7	3.2	51.4	41.5	44.6	4.6	47.8	50.2	46.4
Retail Trade	1.5	46.0	16.1	41.0	1.4	47.9	17.4	41.3	2.9	44.7	27.4	42.4	8.5	45.6	33.7	43.3
Transportation and Warehousing	1.8	56.6	21.5	47.2	2.3	54.7	21.3	46.9	2.9	54.4	30.0	45.2	3.8	54.0	37.5	48.4
Information	2.4	45.4	23.2	40.6	3.3	45.7	23.1	41.2	5.3	46.1	40.0	43.7	5.0	43.3	70.3	41.6
Finance and Insurance	2.3	48.4	24.3	40.3	2.6	48.1	24.4	40.4	3.0	48.4	33.2	43.8	5.3	47.3	51.2	46.4
Real Estate and Rental and Leasing	2.5	38.3	15.6	39.3	2.1	35.2	15.3	41.5	3.7	36.4	24.9	42.6	11.9	38.4	58.6	41.1
Professional, Scient, and Tech Serv	1.9	41.0	23.0	44.9	2.1	39.7	24.8	45.6	3.5	40.7	43.1	39.9	5.4	43.4	63.6	43.6
Management, Admin and Support	1.5	48.4	15.2	39.6	2.0	49.4	14.3	40.1	2.6	47.2	25.5	42.9	4.9	48.9	73.5	34.5
Educational Services	2.5	35.3	14.1	38.9	2.9	33.8	14.3	39.5	5.4	30.9	22.8	40.8	6.6	33.4	31.1	46.9
Health Care and Social Assistance	2.5	41.2	14.9	39.1	2.7	42.7	15.8	39.4	3.6	42.3	24.2	41.0	6.8	40.2	55.7	43.7
Arts, Entertainment, and Recreat	3.2	36.4	19.1	35.6	3.1	37.3	20.8	35.9	3.9	34.2	26.7	42.0	5.7	38.1	23.2	44.9
Accomodations and Food Services	1.3	42.8	13.0	36.8	1.5	45.9	13.5	36.8	1.8	42.5	21.5	42.4	3.0	46.5	23.0	34.2
Other Services (Except Pub Admin	1.4	37.8	19.0	39.7	1.9	44.8	23.0	40.9	2.5	41.0	86.8	40.0	4.5	44.2	27.7	42.7
Public Adm and Active Duty Milit	2.4	51.4	22.3	41.5	3.1	50.2	23.3	42.1	3.6	44.6	29.3	41.5	5.3	46.9	33.7	43.8

Source: Own elaboration using NLSY79 and ENIGH2010.

Figure 3.1 Avg. Locus of Equilibria Ind Urban Mex-U.S. 2010-2009

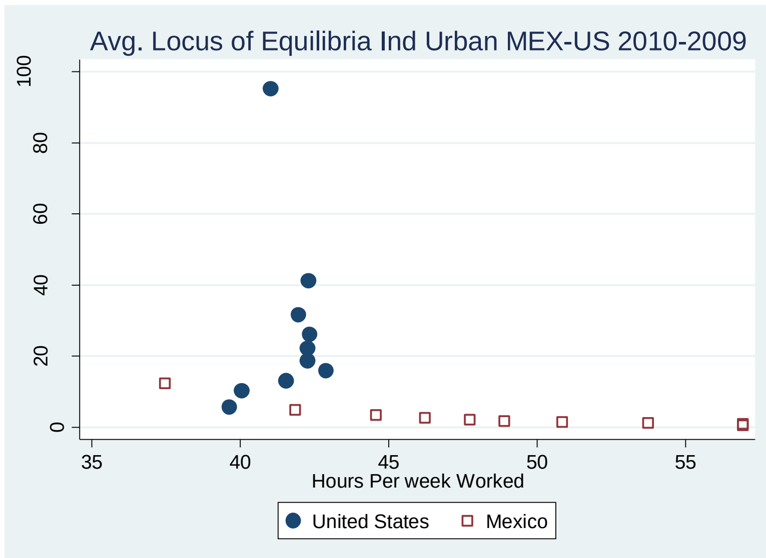

Figure 3.2 Individual United States - Mexico LSCs

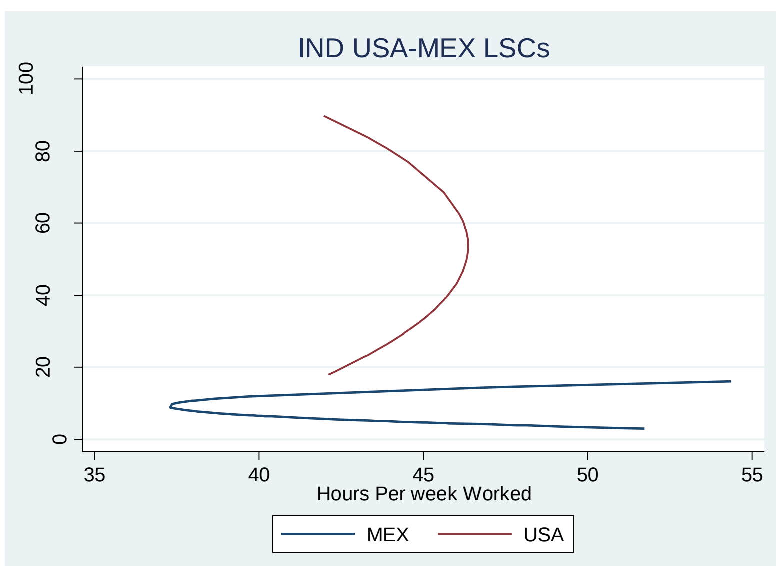

Figure 3.3 Possible implications of the minimum wage with a backward bending and a forward falling LSC

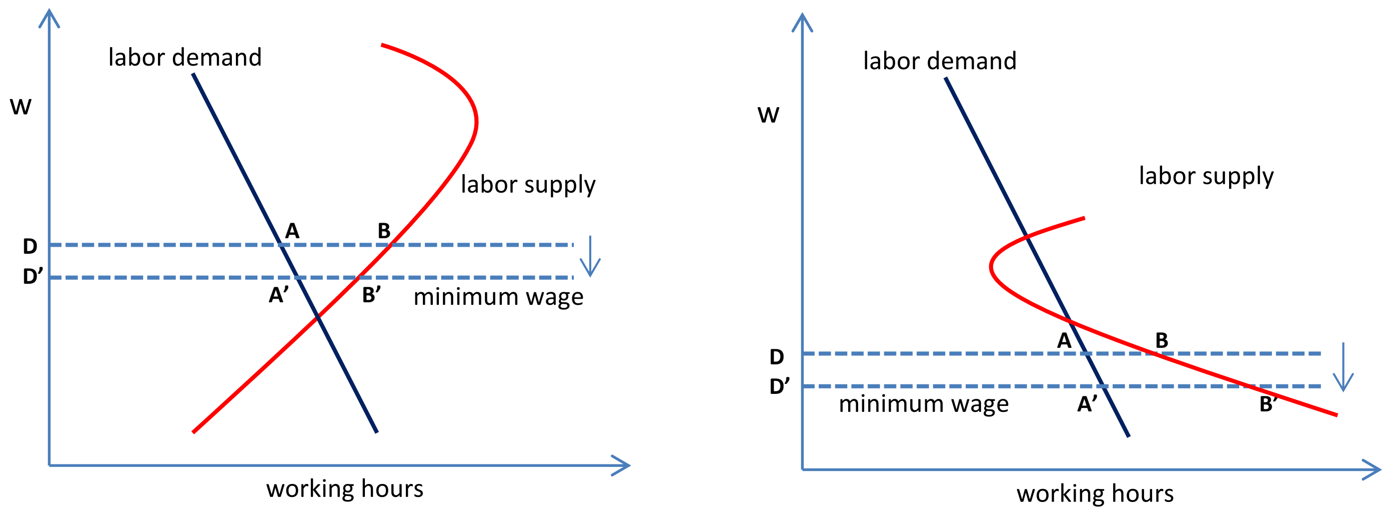

Figure 3.3.a

Figure 3.3.b

Table 3.2.1 U.S., Individual, Homogeneous Units of Labor, Quadratic Functional Form

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Dep. var.: h							
$\hat{w}$	**0.315*****	**0.158*****	**0.213*****	**0.214*****	**0.174*****	**0.272*****	**0.287*****
	(0.080)	(0.055)	(0.049)	(0.049)	(0.049)	(0.053)	(0.053)
$\hat{w}^2$	**-0.002*****	**-0.001***	**-0.001*****	**-0.001*****	**-0.001***	**-0.001*****	**-0.001*****
	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
sex		-5.385***	-4.428***	-4.531***	-4.579***	-4.177***	-4.071***
		(0.401)	(0.399)	(0.399)	(0.386)	(0.430)	(0.437)
Marita10				0.463***			
				(0.150)			
Cons	36.937***	47.413***	44.868***	44.343***	45.856***	43.752***	43.331***
	(1.131)	(1.327)	(1.246)	(1.256)	(1.170)	(1.351)	(1.358)
End. reg w							
WEconMed	1.507***	-0.014	0.032	0.033	1.377***		
	(0.104)	(0.091)	(0.099)	(0.100)	(0.112)		
WEconMedsq	-0.006***				-0.004***		
	(0.001)				(0.001)		
WEconMean		0.997***	0.975***	0.971***		0.822***	0.799***
		(0.075)	(0.082)	(0.082)		(0.114)	(0.115)
WEconMeansq						0.002	0.002
						(0.001)	(0.001)
MOneLoc			3.283***	3.280***			2.303***
			(0.865)	(0.865)			(0.887)
Size F 50-500					3.153***	3.419***	3.053***
					(0.872)	(0.861)	(0.876)
Size F more 500					5.263***	5.575***	5.064***
					(1.171)	(1.153)	(1.177)
Sex		-3.383***	-3.434***	-3.321***	-3.415***	-3.531***	-3.559***
		(0.736)	(0.787)	(0.791)	(0.795)	(0.784)	(0.787)
Marita10				-0.513			
				(0.351)			
Cons	-2.797*	5.423***	3.119*	3.736**	2.275	6.213***	5.303**
	(1.553)	(1.462)	(1.674)	(1.722)	(2.137)	(2.309)	(2.351)
End. reg w^2							
WEconMed	107.259***	-109.788***	-119.454***	-119.292***	97.271***		
	(31.302)	(27.520)	(31.639)	(31.646)	(35.785)		
WEconMedsq	0.441				0.696		
	(0.418)				(0.481)		
WEconMean		222.333***	234.704***	234.162***		17.752	16.956
		(22.615)	(26.006)	(26.022)		(36.647)	(36.940)
WEconMeansq						1.693***	1.700***
						(0.463)	(0.466)
MOneLoc			188.356	189.415			122.595
			(274.670)	(274.792)			(284.473)
Size F 50-500					556.743**	577.674**	562.444**
					(278.092)	(275.797)	(281.135)
Size F more 500					-43.062	-78.231	-107.798
					(373.208)	(369.439)	(377.741)
Sex		53.582	95.733	114.227	30.001	46.894	47.463
		(223.290)	(249.733)	(251.179)	(253.555)	(251.300)	(252.592)
Marita10				-79.591			
				(111.535)			
Cons	-958.238**	-1987.743***	-2279.242***	-2186.461***	-1147.771*	-588.476	-648.258
	(467.015)	(443.205)	(531.349)	(546.955)	(681.110)	(740.024)	(754.222)
Min eig stat	7.455	17.779	12.547	12.536	5.871	9.384	7.674
Sargan			0.000	0.000	0.000	0.000	0.000

Source: Own elaboration using NLSY79. *** Statistically significant at 1%, ** Statistically significant at 5%, *Statistically significant at 10%. Standard errors between parenthesis.

Table 3.2.2 U.S., Individual, Homogeneous Units of Labor,
Considering Sample Selection Bias,
Quadratic Functional Form

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Dep. var.: h							
$\hat{w}$	**.224****	**.184*****		**.187*****	**.172***	**.303*****	
	(.104)	(.069)		(.069)	(.100)	(.086)	
$\hat{w}^2$	**-.001**	**-.001****		**-.001****	**-.001**	**-.002*****	
	(.001)	(.000)		(.000)	(.001)	(.000)	
sex		-5.497***		-5.602***	-5.459***	-5.112***	
		(.404)		(-5.602)	(.416)	(.420)	
Marita10				.413***			
				(.152)			
Cons	39.158***	47.791***		47.293***	48.292***	45.300***	
	(2.244)	(1.909)		(1.913)	(2.403)	(2.200)	
End. reg w							
WEconMed	1.592***	.006		.008	1.623***		
	(.178)	(.096)		(.097)	(.174)		
WEconMedsq	-.006***				-.007***		
	(.002)				(.002)		
WEconMean		.970***		.967***		1.049***	
		(.080)		(.080)		(.156)	
WEconMeansq						-.001	
						(.002)	
Sex		-3.029***		-2.917***	-3.442***	-3.180***	
		(.864)		(.864)	(.883)	(.868)	
Marita10				-.574*			
				(.338)			
Cons	-6.783	3.768		4.372*	-2.845	2.124	
	(4.131)	(2.323)		(2.332)	(3.756)	(3.730)	
End. reg w^2							
WEconMed	123.056**	-104..142***		-103.871***	129.529**		
	(53.243)	(29.556)		(29.582)	(51.763)		
WEconMedsq	.350				.287		
	(.608)				(.596)		
WEconMean		227.346		227.057***		40.540	
		(24.546)		(24.566)		(47.009)	
WEconMeansq						1.296**	
						(.517)	
Sex		-90.744		-73.997	-65.602	50.693	
		(263.861)		(264.181)	(26.350)	(261.688)	
Marita10				-92.643			
				(103.334)			
Cons	-1672.54	-2662.413***		-2573.618***	-1757.944	-804.221	
	(1236.232)	(709.241)		(712.551)	(1115.468)	(1125.306)	

Source: Own elaboration using NLSY79. *** Statistically significant at 1%, ** Statistically significant at 5%, *Statistically significant at 10%. Standard errors between parenthesis.

Table 3.3.1 U.S., Individual, Heterogeneous Units of Labor, Quadratic Functional Form

Dep. var.: h	(1) E ≤ HS	(2) E in HS	(3) E = HS	(4) E in C	(5) E = C	(6) E in GS
$(\hat{w})$	**.400*** **	**.378*** **	**.370***	**.212*** **	**.057**	**.245**
	(.096)	(.093)	(.190)	(.071)	(.093)	(.150)
$(\hat{w})^2$	**-.001**	**-.001**	**-.000**	**-.001** **	**-.000**	**-.001**
	(.001)	(.000)	(.003)	(.000)	(.000)	(.001)
Cons	34.575***	34.766***	34.768***	38.095***	42.231***	39.962***
	(1.491)	(1.543)	(1.941)	(1.374)	(2.214)	(3.611)
End. reg (w)						
WEconMean	.350	-.076	-.194	.778***	.400	.935
	(.519)	(.700)	(1.130)	(.235)	(.958)	(.685)
WEconMeansq	.015	.025	.027	.003	.008	.001
	(.013)	(.017)	(.028)	(.003)	(.012)	(.006)
Size F 50 - 500H	.006***	2.544**	2.045**	3.729***	4.254	7.136*
	(.002)	(1.030)	(.990)	(1.383)	(3.034)	(4.255)
Size F more 500H		3.706**	3.983***	6.867***	9.149***	10.001*
		(1.501)	(1.399)	(1.721)	(3.455)	(5.583)
Cons	5.019	9.657	11.351	.878	7.545	-3.208
	(5.078)	(6.946)	(11.086)	(3.979)	(17.335)	(16.197)
End. reg $(w)^2$						
WEconMean	-422.056***	-699.151***	-65.672	-24.820	-94.049	79.838
	(155.514)	(211.351)	(247.477)	(68.138)	(312.107)	(258.868)
WEconMeansq	13.732***	20.490***	3.159	2.454***	3.568	1.105
	(3.851)	(5.144)	(6.092)	(.934)	(4.055)	(2.457)
Size F 50 - 500H	.377	333.284	63.321	625.636	1107.947	2035.724
	(.600)	(311.128)	(216.828)	(400.378)	(988.550)	(1606.684)
Size F more 500H		-78.291	-47.910	115.433	198.189	133.828
		(453.243)	(306.509)	(498.022)	(1125.709)	(2107.965)
Cons	3420.467**	6139.176***	744.216	-198.061	635.352	-2739.683
	(1522.797)	(2097.167)	(2428.011)	(1151.491)	(5647.807)	(6115.955)
Min eig stat	6.775	6.990	.420	5.617	1.836	.955
Sargan	.368	.441	.085	.003	.005	.255

Source: Own elaboration using NLSY79. *** Statistically significant at 1%, ** Statistically significant at 5%, *Statistically significant at 10%. Standard errors between parenthesis.

Table 3.3.2 U.S., Individual, Heterogeneous Units of Labor, Considering Sample Selection Bias, Quadratic Functional Form

Dep. var.: h	(1) E ≤ HS	(2) E in HS	(3) E = HS	(4) E in C	(5) E = C	(6) E in GS
$(\hat{w})$	**.394*** **	**.478*** **	**-.474**	**.355*** **	**.285**	**.410**
	(.120)	(.117)	(.911)	(.138)	(.836)	(.320)
$(\hat{w})^2$	**-.000**	**-.001**	**.017**	**-.002*** **	**-.002**	**-.002**
	(.001)	(.000)	(.016)	(.001)	(.005)	(.002)
Cons	34.345***	32.843***	34.691***	35.641***	36.916***	33.439***
	(2.443)	(2.542)	(4.346)	(3.469)	(12.151)	(7.935)
End. reg (w)						
WEconMean	.761	.742	1.302	.872***	1.259	.864
	(.543)	(.706)	(1.164)	(.310)	(.966)	(.840)
WEconMeansq	.004	.004	-.012	.001	-.004	.001
	(.013)	(.017)	(.029)	(.004)	(.012)	(.008)
Cons	3.574	3.957	.639	3.882	-3.242	-4.235
	(6.300)	(7.928)	(11.464)	(7.784)	(16.869)	(19.127)
End. reg $(w)^2$						
WEconMean	-344.556**	-571.772***	119.919	-9.742	79.571	34.079
	(156.049)	(204.318)	(244.661)	(85.661)	(309.033)	(278.267)
WEconMeansq	11.539***	17.065***	-1.844	2.051*	1.034	1.442
	(3.742)	(4.860)	(6.073)	(1.050)	(4.027)	(2.719)
Cons	2986.817*	5238.621**	-597.491	368.471	-716.462	-2960.667
	(1810.468)	(2296.105)	(2411.284)	(2151.78)	(5398.884)	(6335.482)

Source: Own elaboration using NLSY79. *** Statistically significant at 1%, ** Statistically significant at 5%, *Statistically significant at 10%. Standard errors between parenthesis.

Table 3.4.1 U.S., Individual, Heterogeneous Units of Labor, Quadratic Functional Form

Dep. var.: h	(1) E ≤ HS	(2) E in HS	(3) E = HS	(4) E in C	(5) E = C	(6) E in GS
$(\hat{w})$	**.508*** **	**.513*** **	**.683*** **	**.088**	**-.305**	**.238* **
	(.077)	(.082)	(.127)	(.090)	(.225)	(.134)
$(\hat{w})^2$	**-.001*** **	**-.001*** **	**-.004*** **	**-.000**	**.001**	**-.001* **
	(.000)	(.000)	(.001)	(.000)	(.001)	(.001)
Cons	33.309***	33.029***	31.740***	40.478***	50.231***	39.868***
	(1.291)	(1.431)	(1.851)	(1.666)	(4.888)	(3.349)
End. reg (w)						
WEconMed	.163	.148	.044	.303*	.133	-.008
	(.164)	(.186)	(.312)	(.164)	(.389)	(.208)
WEconMeansq	.022***	.022***	.024***	.011***	.012***	.009***
	(.003)	(.004)	(.006)	(.002)	(.003)	(.002)
Cons	8.009***	8.359***	9.395***	11.805***	15.908**	23.160***
	(1.845)	(2.088)	(2.888)	(2.630)	(6.921)	(4.803)
End. reg $(w)^2$						
WEconMed	-227.434***	-268.455***	-165.971**	-72.322	-107.590	-110.996
	(46.611)	(53.112)	(67.075)	(45.353)	(120.459)	(73.527)
WEconMeansq	6.806***	7.612***	5.001***	2.645***	3.053***	2.523***
	(.928)	(1.048)	(1.415)	(.459)	(1.112)	(.661)
Cons	1728.99***	2061.584***	1453.134**	900.331	1365.698	2230.227
	(523.221)	(596.182)	(620.973)	(725.719)	(2140.095)	(1698.791)
Min eig stat	25.803	26.393	5.538	8.382	1.526	2.900
Sargan						

Source: Own elaboration using NLSY79. *** Statistically significant at 1%, ** Statistically significant at 5%, *Statistically significant at 10%. Standard errors between parenthesis.

Table 3.4.2 U.S., Individual, Heterogeneous Units of Labor, Considering Sample Selection Bias, Quadratic Functional Form

Dep. var.: h	(1) E ≤ HS	(2) E in HS	(3) E = HS	(4) E in C	(5) E = C	(6) E in GS
$(\hat{w})$	**.588*** **	**.625*** **	**.801*** **	**.101**	**-.125**	**.311* **
	(.101)	(.110)	(.129)	(.137)	(.321)	(.172)
$(\hat{w})^2$	**-.002*** **	**-.002*** **	**-.006*** **	**-.000**	**.000**	**-.002* **
	(.000)	(.000)	(.001)	(.000)	(.002)	(.001)
Cons	31.882***	30.993***	30.967***	40.733***	43.114***	39.093***
	(2.308)	(2.556)	(2.779)	(3.658)	(7.522)	(3.083)
End. reg (w)						
WEconMed	-.029	-.025	.056	.124	.160	.064
	(.192)	(.216)	(.330)	(.234)	(.426)	(.347)
WEconMeansq	.023***	.022***	.018***	.011***	.011***	.009***
	(.003)	(.004)	(.007)	(.002)	(.004)	(.003)
Cons	11.406***	11.593***	12.910***	18.196***	16.611**	20.025***
	(3.318)	(3.711)	(3.994)	(6.389)	(10.291)	(5.955)
End. reg $(w)^2$						
WEconMed	-253.439***	-296.812***	-142.830**	-101.040	-129.843	-108.844
	(54.924)	(62.383)	(69.413)	(63.437)	(136.614)	(123.554)
WEconMeansq	6.980***	7.817***	3.841***	2.776***	3.121***	2.550**
	(.969)	(1.095)	(1.447)	(.514)	(1.235)	(1.093)
Cons	2170.663***	2508.304***	1808.887**	1914.503	2966.991	1414.872
	(947.683)	(1069.17)	(841.487)	(1730.198)	(3301.444)	(2122.388)

Source: Own elaboration using NLSY79. *** Statistically significant at 1%, ** Statistically significant at 5%, *Statistically significant at 10%. Standard errors between parenthesis.

Table 3.5. U.S.,Individual, Heterogeneous Units of Labor, Linear Functional Form

End. var: h	(1) E≤ *HS*	(2) E in HS	(3) E = HS	(4) E in C	(5) E = C	(6) E in GS
ŵ	**0.407*****	**0.366*****	**0.358*****	**0.247*****	**0.189***	**0.124**
	(0.125)	(0.122)	(0.127)	(0.084)	(0.115)	(0.109)
Sex	-4.035***	-4.181***	-4.112***	-3.112***	-2.859	-4.422**
	(0.775)	(0.758)	(0.829)	(0.994)	(1.806)	(1.928)
Cons	39.649***	40.575***	40.719***	40.315***	40.823***	46.642***
	(3.305)	(3.245)	(3.494)	(3.783)	(6.731)	(7.359)
End. reg: w						
Sex	-3.957***	-3.891***	-4.408***	-8.966***	-12.515***	-11.316***
	(0.918)	(0.960)	(0.911)	(1.322)	(2.717)	(4.170)
Size F 50-500	5.540**	2.721**	1.813*	3.261**	2.423	4.950
	(1.020)	(1.068)	(1.018)	(1.475)	(3.118)	(4.608)
Size F More 500	3.894***	4.097***	4.103***	8.229***	7.410**	17.531***
	(1.479)	(1.542)	(1.429)	(1.837)	(3.548)	(5.956)
MOneLoc	3.390***	3.322***	3.842***	3.043**	5.359*	-1.925
	(1.004)	(1.054)	(1.016)	(1.506)	(3.131)	(5.203)
Cons	21.888***	22.018***	22.917***	37.827***	49.141***	58.267***
	(1.559)	(1.632)	(1.569)	(2.536)	(5.293)	(8.444)
F	9.471	8.981	10.084	9.782	2.963	2.904
Sargan	0.522	0.555	0.483	0.062	0.172	0.090

Source: Own elaboration using NLSY79. *** Statistically significant at 1%, ** Statistically significant at 5%, *Statistically significant at 10%. Standard errors between parenthesis.

Table 3.6. U.S., Individual, Heterogeneous Units of Labor, Linear Functional Form

End. var.: h	(1) E≤ HS	(2) E in HS	(3) E = HS	(4) E in C	(5) E = C	(6) E in GS
ŵ	**0.313*****	**0.338*****	**0.324*****	**-0.015**	**-0.182*****	**-0.018**
	(0.073)	(0.083)	(0.090)	(0.027)	(0.054)	(0.039)
sex	-4.956***	-4.933***	-4.694***	-6.709***	-9.121***	-6.328***
	(0.611)	(0.648)	(0.710)	(0.544)	(1.141)	(1.219)
cons	38.061***	37.502***	37.770***	46.563***	54.435***	49.303***
	(1.588)	(1.802)	(2.032)	(0.997)	(2.416)	(2.209)
End. reg: w						
Sex	-1.884**	-1.884**	-2.129**	-5.625***	-10.058***	-6.040
	(0.856)	(0.900)	(0.903)	(1.234)	(2.493)	(3.808)
WEconMed	1.584***	1.604**	1.791*	1.268***	0.306	1.610***
	(0.529)	(0.734)	(0.918)	(0.219)	(1.200)	(0.561)
WEconMedsq	-0.019	-0.019	-0.023	-0.002	0.014	-0.008
	(0.015)	(0.022)	(0.026)	(0.003)	(0.020)	(0.005)
Cons	0.066	0.072	-1.962	3.512	20.725	1.538
	(4.509)	(6.108)	(7.863)	(3.469)	(17.544)	(12.793)
F	40.232	31.964	30.035	106.132	22.319	29.204
Sargan	0.818	0.156	0.386	0.148	0.767	0.479

Source: Own elaboration using NLSY79. *** Statistically significant at 1%, ** Statistically significant at 5%, *Statistically significant at 10%. Standard errors between parenthesis.

Table 3.7.1 Mexico, Individual, Homogeneous Units of Labor, Quadratic Functional Form

	(1)	(2)	(3)
End. var.: h			
ŵ	**-4.152*****	**-4.023*****	**-4.139*****
	(0.263)	(0.439)	(0.270)
$\hat{w}^2$	**0.121*****	**0.114*****	**1.212*****
	(0.014)	(0.024)	(0.014)
Sex	8.764***	8.762***	8.621***
	(0.283)	(0.272)	(0.292)
UrbRur 1	4.976***	4.945***	4.888***
	(0.409)	(0.403)	(0.410)
UrbRur 2	3.600***	3.604***	3.479***
	(0.464)	(0.446)	(0.464)
UrbRur 3	2.024***	1.999***	1.967***
	(0.530)	(0.514)	(0.530)
Region 2	1.131***	1.102***	1.156***
	(0.325)	(0.322)	(0.325)
Region 3	-2.035***	-2.056	-1.972***
	(0.352)	(0.344)	(0.352)
Contract 1	6.806***	6.737***	6.678***
	(0.343)	(0.382)	(0.341)
Contract 3	1.402	1.712	1.457
	(2.304)	(2.377)	(2.305)
Transfers			-0.001***
			(0.001)
Age			4.373***
			(1.572)
Subor			4.373***
			(1.572)
Cons	40.665***	40.569***	38.946***
	(0.482)	(0.534)	(1.777)
End. reg w			
WageEconMedi	0.436***		0.410***
	(0.059)		(0.059)
WEconMedisq	-0.013***		-0.014***
	(0.003)		0.003
WageEconMean	0.659***	1.001***	0.662***
	(0.036)	(0.026)	(0.036)
WageEconMeanSq		-.011***	
		(.002)	
Sex	0.371***	0.357***	0.299***
	(0.035)	(0.035)	(0.036)
UrbRur 1	0.344***	0.341***	0.299***
	(0.050)	(0.050)	(0.049)
UrbRur 2	0.194***	0.204***	0.163***
	(0.057)	(0.057)	(0.057)
UrbRur 3	0.028	0.037	0.011
	(0.065)	(0.065)	(0.065)
Region 2	0.268***	0.266***	0.257***
	(0.040)	(0.040)	(0.039)
Region 3	0.237***	0.235***	0.239***
	(0.043)	(0.043)	(0.043)
Contract 1	0.276***	0.309***	0.238***
	(0.039)	(0.039)	(0.039)
Contract 3	0.613**	0.615**	0.615**
	(0.275)	(0.275)	(0.272)
Transfers			0.000
			(0.000)
Age			0.021***
			(0.001)
Subor 2			0.485**
			(0.193)
Cons	-0.760***	-7.749***	-1.586***
	(0.062)	(0.063)	(0.144)

Table 3.7.1 Mexico, Individual, Homogeneous Units of Labor, Quadratic F.F., Continued

	(1)	(2)	(3)
End. reg w^2			
WageEconMedi	-25.923***		-26.054***
	(4.272)		(4.277)
WEconMedisq	0.805***		0.773***
	(0.236)		(0.237)
WageEconMean	30.376***	10.358***	30.500***
	(2.614)	(1.840)	(2.614)
WageEconMeanSq		0.621***	
		(0.185)	
Sex	4.595*	5.460**	3.082
	(2.531)	(2.562)	(2.612)
UrbRur 1	2.710	2.828	2.124
	(3.562)	(3.566)	(3.577)
UrbRur 2	5.690	5.096	5.153
	(4.109)	(4.109)	(4.113)
UrbRur 3	-1.635	-2.205	-1.900
	(4.690)	(4.691)	(4.690)
Region 2	0.432	0.595	0.239
	(2.841)	(2.842)	(2.843)
Region 3	0.746	0.881	0.880
	(3.112)	(3.113)	(3.112)
Contract 1	0.278	-1.809	-0.092
	(2.797)	(2.767)	(2.807)
Contract 3	54.283***	54.113***	57.719***
	(19.696)	(19.704)	(19.691)
Age			0.315***
			(0.108)
Subor			14.465
			(13.931)
Transfers			-0.002
			(0.005)
Cons	-16.546***	-17.611***	-31.609***
	(4.444)	(4.555)	(10.427)
Min eig stat	29.642	14.118	29.43
Sargan	0.790		.003

Source: Own elaboration using ENIGH2010. *** Statistically significant at 1%, ** Statistically significant at 5%, *Statistically significant at 10%. Standard errors between parenthesis.

Table 3.7.2 Mexico, Individual, Homogeneous Units of Labor, Considering Sample Selection Bias, Quadratic Functional Form

	(1)	(2)	(3)
End. var.: h			
ŵ	**-2.173*** **	**-1.614*** **	**-1.487*** **
	(.179)	(.185)	(.256)
ŵ²	**.032*** **	**.009**	**.018** **
	(.006)	(.007)	(.007)
Sex	7.238***	7.653***	8.622***
	(.374)	(.384)	(.541)
UrbRur 1	6.679***	6.563***	6.683***
	(.295)	(.296)	(.293)
UrbRur 2	5.079***	5.131***	5.249***
	(.342)	(.341)	(.342)
UrbRur 3	2.257***	2.289***	2.452***
	(.386)	(.385)	(.385)
Region 2	1.112***	1.049***	1.080***
	(.235)	(.234)	(.233)
Region 3	-1.803***	-1.866***	-1.808***
	(.256)	(.255)	(.253)
Transfers			-.002
			(.001)
Age			-.013
			(.010)
Cons	42.088***	40.497***	36.564***
	(.980)	(.996)	(1.598)
End. reg w			
WageEconMedi	.678***		1.002***
	(.092)		(.115)
WEconMedisq	-.038***		-.065***
	(.007)		(.008)
WageEconMean	.878***	1.342***	.875***
	(.043)	(.045)	(.046)
WageEconMeanSq		-.017***	
		(.004)	
Sex	1.357***	1.354***	1.882***
	(.090)	(.091)	(.138)
UrbRur 1	.491***	.508***	.504***
	(.057)	(.057)	(.060)
UrbRur 2	.351***	.370***	.361***
	(.067)	(.067)	(.070)
UrbRur 3	.254***	.264***	.283***
	(.075)	(.076)	(.079)
Region 2	.313***	.315***	.328***
	(.046)	(.046)	(.048)
Region 3	.328***	.328***	.369***
	(.050)	(.050)	(.052)
Transfers			-.002***
			(.000)
Age			.016***
			(.002)
Cons	-3.485***	-3.417***	-6.193***
	(.248)	(.244)	(.423)

Table 3.7.2 Mexico, Individual,
Homogeneous Units of Labor,
Considering Sample Selection Bias,
Quadratic Functional Form, Continued

	(1)	(2)	(3)
End. reg w^2			
WageEconMedi	-53.023***		-33.542***
	(6.747)		(8.232)
WEconMedisq	1.874***		.521
	(.514)		(.603)
WageEconMean	54.020***	3.730	52.940***
	(3.087)	(3.304)	(3.176)
WageEconMeanSq		2.563***	
		(.293)	
Sex	25.825***	29.758***	57.058***
	(6.739)	(6.780)	(10.146)
UrbRur 1	6.726	8.132*	9.505**
	(4.271)	(4.290)	(4.437)
UrbRur 2	9.515*	9.453*	12.346**
	(4.998)	(5.023)	(5.133)
UrbRur 3	5.338	5.259	8.648
	(5.644)	(5.661)	(5.778)
Region 2	3.995	4.078	5.231
	(3.401)	(3.406)	(3.463)
Region 3	3.842	3.652	6.038
	(3.720)	(3.725)	(3.802)
Age			.063
			(.135)
Transfers			-.062***
			(.011)
Cons	-71.189***	-68.419***	-179.449***
	(18.450)	(18.213)	(31.218)

Source: Own elaboration using ENIGH2010. *** Statistically significant at 1%, ** Statistically significant at 5%, *Statistically significant at 10%. Standard errors between parenthesis.

Table 3.8.1 Mexico, Individual, Heterogeneous Units of Labor, Quadratic Functional Form

Dep. var.: h	(1) E ≤ HS	(2) E in HS	(3) E = HS	(4) E in C	(5) E = C	(6) E in GS
$(\hat{w})$	**-4.713*** **	**-4.817*** **	**-7.883*** **	**-7.336*** **	**-11.414*** **	**-4.317*** **
	(.501)	(1.142)	(1.721)	(.920)	(2.257)	(1.538)
$(\hat{w})^2$	**.053*** **	**.055**	**.177** **	**.260*** **	**.389*** **	**.129* **
	(.020)	(.056)	(.072)	(.059)	(.140)	(.071)
Sex	9.694***	7.619***	8.697***	6.015***	5.847**	7.224***
	(.331)	(.649)	(1.130)	(.848)	(2.621)	(2.142)
UrbRur1		3.149***	3.674**	3.455*	6.464	1.397
		(.801)	(1.448)	(1.814)	(5.119)	(5.094)
UrbRur2		3.523***	2.288	1.660	3.418	-3.650
		(.938)	(1.674)	(2.007)	(5.704)	(5.689)
UrbRur3		1.673*	1.786	1.660	3.179	-2.179
		(1.009)	(1.834)	(2.214)	(6.005)	(6.498)
Region2	.130	-.380	1.132	1.075	1.888	5.976**
	(.381)	(.674)	(1.197)	(.945)	(2.838)	(2.906)
Region3	-3.024***	-3.299***	-2.506*	-.517	.214	.537
	(.412)	(.756)	(1.319)	(1.020)	(2.990)	(2.616)
Contract1	6.434***	6.401***	6.030***	9.271***	11.343***	3.994
	(.360)	(.547)	(.957)	(1.077)	(3.201)	(3.109)
Contract3	3.634	7.337**	6.803	-64.781***	-292.765**	7.098
	(2.244)	(3.300)	(6.144)	(21.149)	(138.024)	(21.496)
Cons	46.958***	45.619***	49.340***	48.202***	59.361***	47.145***
	(.631)	(1.104)	(1.956)	(2.711)	(8.443)	(6.223)
End. reg (w)						
WEconMedi	.705***	.326**	.260	.457***	.490***	.625***
	(.075)	(.147)	(.208)	(.115)	(.188)	(.136)
WEconMeansq	.086***	.174***	.184***	.078***	.068***	.021***
	(.009)	(.021)	(.030)	(.012)	(.019)	(.007)
Sex	.157***	.206***	.202**	.596***	.906***	.889***
	(.040)	(.076)	(.096)	(.097)	(.191)	(.230)
UrbRur1		.346***	.355**	.556**	.990**	.547
		(123)	(.159)	(.223)	(.438)	(.563)
UrbRur2		.315**	.291	.401*	.748	-.197
		(.139)	(.179)	(.244)	(.480)	(.610)
UrbRur3		.183	.306	.156	.426	-.921
		(.163)	(.208)	(.277)	(.532)	(.724)
Region2	.269***	.249***	.207*	.475***	.646***	.794***
	(.047)	(.086)	(.108)	(.112)	(.215)	(.268)
Region3	.291***	.239**	.131	.289**	.349	.219
	(.051)	(.094)	(.122)	(.128)	(.253)	(.293)
Contract1	.126***	.185**	.259***	.656***	.898***	.510*
	(.041)	(.078)	(.099)	(.113)	(.247)	(.296)
Contract3	.022	-.016	-.052	4.688***	12.296***	-1.221
	(.286)	(.538)	(.706)	(.826)	(1.779)	(2.402)
Cons	.171*	.020	.072	-.491*	-1.225*	.475
	(.089)	(.203)	(.275)	(.296)	(.639)	(.734)

Table 3.8.1 Mexico, Individual, Heterogeneous Units of Labor, Quadratic Functional Form, Continued

End. reg $(w)^2$						
WEconMedi	-14.188***	-9.708	-19.289	-8.643*	-7.514	-3.874
	(4.244)	(9.348)	(14.288)	(5.097)	(8.763)	(12.328)
WEconHMeansq	4.406***	5.353***	7.210***	2.778***	2.480***	1.245**
	(.502)	(1.339)	(2.043)	(.552)	(.911)	(.627)
Sex	-1.365	-4.517	-6.869	12.662***	20.731**	17.500
	(2.261)	(4.829)	(6.616)	(4.268)	(8.880)	(20.852)
UrbRur1		1.952	2.590	12.096	22.011	19.242
		(7.790)	(10.948)	(9.844)	(20.395)	(50.951)
UrbRur2		12.628	14.624	13.032	23.104	19.947
		(8.825)	(12.340)	(10.779)	(22.341)	(55.198)
UrbRur3		6.035	10.021	2.480	8.894	-27.764
		(10.333)	(14.308)	(12.219)	(24.802)	(65.559)
Region2	3.334	-2.674	-5.703	10.663**	17.516*	-8.865
	(2.637)	(5.477)	(7.460)	(4.972)	(10.040)	(24.256)
Region3	3.137	-4.251	-8.120	4.804	10.769	1.974
	(2.879)	(5.975)	(8.405)	(5.642)	(11.785)	(26.556)
Contract1	-2.103	1.085	3.621	4.809	9.345	-7.941
	(2.318)	(4.953)	(6.824)	(4.991)	(11.486)	(26.843)
Contract3	-4.345	-3.718	-4.618	403.591***	1144.174***	-50.071
	(16.138)	(34.123)	(48.542)	(36.501)	(82.848)	(217.442)
Cons	11.986**	4.435	11.756	-18.038	-39.315	28.176
	(5.004)	(12.850)	(18.905)	(13.063)	(29.744)	(66.471)
Min eig stat	33.475	2.428	2.615	7.877	2.449	1.356
Sargan						

Source: Own elaboration using ENIGH2010. *** Statistically significant at 1%, ** Statistically significant at 5%, *Statistically significant at 10%. Standard errors between parenthesis.

Table 3.8.2 Mexico, Individual, Heterogeneous Units of Labor,
Considering Sample Selection Bias,
Quadratic Functional Form

Dep. var.: h	(1) E ≤ HS	(2) E in HS	(3) E = HS	(4) E in C	(5) E = C	(6) E in GS
$(\hat{w})$	**-4.363*****	**-3.187****	**-5.484*****	**-3.750*****	**-8.693*****	**-3.140*****
	(.687)	(1.313)	(1.426)	(.366)	(.427)	(.284)
$(\hat{w})^2$	**.055*****	**-.022**	**.134****	**.096*****	**.252*****	**.052*****
	(.016)	(.061)	(.061)	(.020)	(.020)	(.006)
Sex	9.057***	6.049***	6.947***	6.122***	4.433***	7.891***
	(.358)	(.611)	(.738)	(.471)	(.725)	(.560)
UrbRur1		3.570***	3.674***	5.245***	6.761***	2.968**
		(.817)	(.952)	(1.018)	(1.399)	(1.301)
UrbRur2		4.717***	3.086***	3.283***	2.990*	-.883
		(1.000)	(1.144)	(1.127)	(1.565)	(1.411)
UrbRur3		1.994*	1.285	.598	-7.016***	-3.014*
		(1.070)	(1.234)	(1.351)	(1.943)	(1.675)
Region2	-.683	-1.477**	-.072	1.396***	.148	3.909***
	(.417)	(.644)	(.774)	(.540)	(.804)	(.652)
Region3	-3.640***	-4.368***	-3.810***	-.694	.849	.783
	(.454)	(.726)	(.886)	(.590)	(.819)	(.680)
Cons	53.887***	52.390***	52.619***	42.367***	58.545***	44.516***
	(1.649)	(2.948)	(3.155)	(2.046)	(2.466)	(1.814)
End. reg (w)						
WEconMedi	.371***	.525***	.535**	.351***	-.279	.065
	(.116)	(.196)	(.235)	(.132)	(.274)	(.168)
WEconMeansq	.155***	.144***	.140***	.126***	.151***	.066***
	(.009)	(.020)	(.027)	(.017)	(.030)	(.009)
Sex	.188***	.207***	.212**	.624***	.965***	1.124***
	(.044)	(.077)	(.097)	(.110)	(.214)	(.251)
UrbRur1		.312***	.320**	.483*	.702	.634
		(.122)	(.159)	(.251)	(.483)	(.606)
UrbRur2		.260*	.210	.303	.588	-.136
		(.139)	(.180)	(.276)	(.531)	(.656)
UrbRur3		.238	.367*	.393	.815	-.885
		(.163)	(.207)	(.314)	(.591)	(.784)
Region2	.269***	.239***	.191*	.440***	.591**	.832***
	(.051)	(.087)	(.109)	(.128)	(.241)	(.291)
Region3	.322***	.235* *	.116	.300**	.312	.295
	(.056)	(.094)	(.122)	(.145)	(.282)	(.317)
Cons	.361	-.243	-.341	-1.497***	-.618	-.200
	(.229)	(.526)	(.575)	(.496)	(.750)	(.874)
End. reg $(w)^2$						
WEconMedi	-44.329***	-10.506	-14.116	-19.970***	-35.404**	-48.016***
	(6.398)	(12.093)	(15.597)	(6.955)	(15.496)	(15.164)
WEconHMeansq	8.609***	4.375***	5.449***	4.766***	5.344***	4.823***
	(.480)	(1.229)	(1.825)	(.893)	(1.722)	(.822)
Sex	.183	-4.602	-6.774	14.361**	28.349**	32.988
	(2.433)	(4.739)	(6.486)	(6.094)	(12.748)	(24.287)
UrbRur1		1.445	2.130	11.441	16.370	22.549
		(7.544)	(10.642)	(13.846)	(28.822)	(58.794)
UrbRur2		11.843	13.138	12.899	24.800	19.887
		(8.604)	(12.049)	(15.245)	(31.703)	(63.690)
UrbRur3		6.790	10.649	28.903*	60.859*	-31.649
		(10.041)	(13.917)	(17.314)	(35.276)	(76.002)
Region2	2.799	-2.675	-5.581	13.256*	27.239*	4.834
	(2.834)	(5.365)	(7.288)	(7.090)	(14.360)	(28.176)
Region3	2.977	-4.498	-8.793	7.948	8.548	1.281
	(3.076)	(5.829)	(8.200)	(8.023)	(16.831)	(30.704)
Cons	42.246***	15.797	14.468	-39.376	-23.184	30.061
	(12.674)	(32.428)	(38.300)	(26.880)	(43.609)	(82.318)

Source: Own elaboration using ENIGH2010. *** Statistically significant at 1%, ** Statistically significant at 5%, *Statistically significant at 10%. Standard errors between parenthesis.

Table 3.9.1 Mexico, Individual, Heterogeneous Units of Labor, Quadratic Functional Form

Dep. var.: h	(1) E ≤ HS	(2) E in HS	(3) E = HS	(4) E in C	(5) E = C	(6) E in GS
$(\hat{w})$	**-1.547*****	**-.754**	**-5.495*****	**-5.105*****	**-9.528*****	**-3.401*****
	(.469)	(1.567)	(1.501)	(.487)	(1.301)	(.479)
$(\hat{w})^2$	**-.003**	**-.089**	**.119***	**.146*****	**.246*****	**.054*****
	(.012)	(.078)	(.064)	(.029)	(.057)	(.010)
Cons	50.153***	49.413***	56.743***	55.638***	73.624***	57.494***
	(.722)	(2.135)	(2.230)	(1.088)	(4.768)	(2.064)
End. reg (w)						
WEconMedi	.344***	.348**	.274	.237*	.066	.228
	(.077)	(.143)	(.204)	(.123)	(.192)	(.145)
WEconMeansq	.163***	.172***	.183***	.103***	.098***	.053***
	(.009)	(.021)	(.030)	(.014)	(.021)	(.007)
Cons	.800***	.706***	.776***	1.391***	2.185***	2.822***
	(.087)	(.153)	(.217)	(.180)	(.398)	(.443)
End. reg $(w)^2$						
WEconMedi	-38.468***	-8.744	-16.133	-22.055***	-29.184***	-43.305***
	(4.277)	(8.862)	(13.673)	(6.794)	(11.353)	(13.959)
WEconHMeansq	8.960***	5.251***	6.891***	4.195***	4.426***	4.461***
	(.489)	(1.316)	(2.004)	(.757)	(1.238)	(.703)
Cons	31.338***	3.475	7.660	30.517***	52.137**	109.514***
	(4.782)	(9.459)	(14.555)	(9.906)	(23.577)	(42.623)
Min eig stat	144.538	2.450	2.220	10.683	5.233	14.265
Sargan						

Source: Own elaboration using ENIGH2010. *** Statistically significant at 1%, ** Statistically significant at 5%, *Statistically significant at 10%. Standard errors between parenthesis.

Table 3.9.2 Mexico, Individual, Heterogeneous Units of Labor, Considering Sample Selection Bias, Quadratic Functional Form

Dep. var.: h	(1) E ≤ HS	(2) E in HS	(3) E = HS	(4) E in C	(5) E = C	(6) E in GS
$(\hat{w})$	**-3.300*****	**-5.415*****	**-6.769*****	**-4.798*****	**-10.290*****	**-3.493*****
	(.567)	(1.513)	(1.478)	(.360)	(.462)	(.304)
$(\hat{w})^2$	**.033****	**.070**	**.182*****	**.147*****	**.314*****	**.062*****
	(.014)	(.072)	(.068)	(.019)	(.022)	(.007)
Cons	55.401***	63.522***	63.287***	52.858***	69.796***	53.372***
	(1.104)	(3.404)	(3.390)	(1.595)	(1.558)	(1.292)
End. reg (w)						
WEconMedi	.356***	.503***	.500**	.196	-.533**	-.028
	(.091)	(.196)	(.234)	(.130)	(.268)	(.169)
WEconMeansq	.154***	.148***	.144***	.139***	.170***	.071***
	(.009)	(.020)	(.027)	(.017)	(.030)	(.009)
Cons	.756***	.315	.200	-.257	1.387***	1.367**
	(.137)	(.511)	(.554)	(.414)	(.482)	(.604)
End. reg $(w)^2$						
WEconMedi	-41.685***	-9.560	-12.097	-23.054***	-40.937***	-49.707***
	(5.034)	(12.061)	(15.541)	(6.835)	(15.101)	(15.097)
WEconHMeansq	8.574***	4.305***	5.216***	5.026***	5.820***	4.912***
	(.478)	(1.228)	(1.821)	(.886)	(1.706)	(.818)
Cons	37.792***	13.088	8.671	-6.384	36.527	73.008
	(7.534)	(31.440)	(36.801)	(22.141)	(26.941)	(54.352)

Source: Own elaboration using ENIGH2010. *** Statistically significant at 1%, ** Statistically significant at 5%, *Statistically significant at 10%. Standard errors between parenthesis.

Table 3.10. Mexico, Individual, Heterogeneous Units of Labor, Linear Functional Form

	(1) E≤ HS	(2) E in HS	(3) E = HS	(4) E in C	(5) E = C	(6) E in GS
End. var.: h						
ŵ	**-1.946*****	**-3.532*****	**-4.144*****	**-3.804*****	**-6.594*****	**-2.143*****
	(0.291)	(0.443)	(0.505)	(0.189)	(0.589)	(0.225)
Sex	9.191***	7.145***	6.908***	7.630***	10.421***	7.744***
	(0.242)	(0.499)	(0.601)	(0.489)	(1.280)	(0.652)
UrbRur1	4.486***	2.817***	2.912***	5.147***	11.247***	2.962*
	(0.328)	(0.811)	(1.002)	(1.117)	(2.837)	(1.526)
UrbRur 2	4.257***	3.781***	3.794***	3.759***	9.040***	-0.605
	(0.364)	(0.914)	(1.122)	(1.227)	(3.142)	(1.646)
UrbRur3	1.964***	1.692	2.334*	2.058	5.275	-3.689*
	(0.396)	(1.060)	(1.299)	(1.392)	(3.483)	(1.965)
Region 2	-0.004	-0.834	-0.619	2.399***	6.301***	3.427***
	(0.266)	(0.570)	(0.679)	(0.567)	(1.434)	(0.749)
Region 3	-3.347***	-3.681***	-4.276***	-0.148	3.017*	0.563
	(0.292)	(0.614)	(0.757)	(0.640)	(1.658)	(0.795)
Contract 1	6.389***	5.969***	5.267***	7.485***	9.228***	1.514*
	(0.277)	(0.519)	(0.645)	(0.601)	(1.750)	(0.824)
Contract 3	5.316***	6.890**	6.051	24.063***	95.193***	2.825
	(1.732)	(3.417)	(4.369)	(4.274)	(13.922)	(6.510)
Cons	38.852***	44.852***	47.101***	40.758***	44.814***	45.764***
	(0.389)	(0.998)	(1.220)	(1.272)	(3.512)	(1.855)
End. reg w						
WageEconMedi	1.117***	1.256***	1.299***	1.124***	1.055***	0.960***
	(0.037)	(0.086)	(0.107)	(0.042)	(0.095)	(0.080)
Sex	0.210***	0.232***	0.235**	0.668***	0.999***	0.926***
	(0.027)	(0.076)	(0.096)	(0.096)	(0.189)	(0.230)
UrbRur1	0.333***	0.365***	0.368**	0.640***	1.097**	0.612
	(0.035)	(0.123)	(0.160)	(0.223)	(0.438)	(0.561)
UrbRur2	0.246***	0.316**	0.274	0.424*	0.774	-0.171
	(0.040)	(0.140)	(0.180)	(0.245)	(0.481)	(0.608)
UrbRur3	0.111**	0.174	0.291	0.211	0.499	-0.887
	(0.045)	(0.164)	(0.209)	(0.278)	(0.533)	(0.723)
Region 2	0.180***	0.256***	0.213**	0.514***	0.722***	0.854***
	(0.030)	(0.087)	(0.109)	(0.113)	(0.215)	(0.267)
Region 3	0.252***	0.227**	0.119	0.296**	0.381	0.248
	(0.033)	(0.095)	(0.122)	(0.128)	(0.253)	(0.293)
Contract 1	0.177***	0.133*	0.232**	0.535***	0.746***	0.445
	(0.029)	(0.077)	(0.098)	(0.112)	(0.243)	(0.296)
Contract 3	0.029	-0.025	-0.027	4.764***	12.509***	-1.304
	(0.200)	(0.531)	(0.710)	(0.830)	(1.782)	(2.403)
Cons	-0.445***	-0.643***	-0.723***	-1.244***	-1.777***	-0.239
	(0.054)	(0.180)	(0.231)	(0.270)	(0.620)	(0.693)
F	883.26	211.063	148.404	701.501	122.497	144.338
Sargan						

Source: Own elaboration using ENIGH2010. *** Statistically significant at 1%, ** Statistically significant at 5%, *Statistically significant at 10%. Standard errors between parenthesis.

Table 3.11. Mexico, Individual, Heterogeneous Units of Labor, Linear Functional Form

	(1) E≤ HS	(2) E in HS	(3) E = H	(4) E in C	(5) E = C	(6) E in GS
End. var.: h						
ŵ	**-2.817*****	**-3.950*****	**-4.123*****	**-4.399*****	**-5.340*****	**-3.047*****
	(0.435)	(0.585)	(0.620)	(0.319)	(0.653)	(0.506)
Sex	9.359***	7.224***	6.904***	7.907***	9.581***	8.522***
	(.0251)	(0.517)	(0.604)	(0.538)	(1.105)	(0.884)
UrbRur1	4.889***	2.969***	2.905***	5.265***	10.717***	3.575*
	(0.363)	(0.842)	(1.009)	(1.200)	(2.371)	(1.906)
UrbRur 2	4.572***	3.929***	3.787***	3.856***	8.430***	-0.587
	(0.384)	(0.947)	(1.126)	(1.319)	(2.626)	(2.033)
UrbRur3	2.120***	1.784	2.327*	2.156	4.785*	-4.366*
	(0.403)	(1.090)	(1.302)	(1.496)	(2.907)	(2.447)
Region 2	0.165	-0.733	-0.624	2.571***	5.609***	4.201***
	(0.275)	(0.591)	(0.682)	(0.614)	(1.219)	(0.994)
Region 3	-3.131***	-3.605***	-4.279***	-0.148	2.679*	0.822
	(0.305)	(0.633)	(0.756)	(0.688)	(1.386)	(0.990)
Contract 1	6.788***	6.160***	5.256***	8.383***	7.431***	2.445**
	(0.315)	(0.558)	(0.672)	(0.745)	(1.584)	(1.107)
Contract 3	5.381***	6.913**	6.049	27.086***	78.825***	2.014
	(1.745)	(3.505)	(4.362)	(4.757)	(12.897)	(8.050)
Cons	39.449***	45.280***	47.079***	41.805***	41.854***	48.665***
	(0.450)	1.091	(1.280)	(1.433)	(3.098)	(2.662)
End. reg w						
Type Firm 2	0.169***	0.332***	0.369***	0.486***	0.914***	1.247***
	(0.032)	(0.095)	(0.125)	(0.153)	(0.348)	(0.439)
Type Firm 3	1.013***	1.402***	1.507***	2.204***	2.397***	2.447***
	(0.052)	(0.131)	(0.163)	(0.167)	(0.358)	(0.444)
Type Firm 4	0.751***	0.817**	1.036**	1.388***	1.631***	2.685***
	(0.145)	(0.330)	(0.405)	(0.339)	(0.636)	(0.662)
Sex	0.193***	0.214***	0.228**	0.651***	0.855***	0.983***
	(0.027)	(0.077)	(0.097)	(0.101)	(0.191)	(0.235)
UrbRur1	0.471***	0.408***	0.422***	0.567**	0.907**	0.936
	(0.035)	(0.125)	(0.161)	(0.233)	(0.444)	(0.573)
UrbRur2	0.356***	0.347**	0.302*	0.273	0.637	0.090
	(0.041)	(0.141)	(0.182)	(0.255)	(0.487)	(0.618)
UrbRur3	0.182***	0.205	0.309	0.261	0.496	-0.787
	(0.046)	(0.165)	(0.211)	(0.289)	(0.540)	(0.735)
Region 2	0.222***	0.301***	0.277**	0.518***	0.822***	1.071***
	(0.030)	(0.088)	(0.110)	(0.118)	(0.220)	(0.276)
Region 3	0.266***	0.230**	0.157	0.163	0.403	0.441
	(0.033)	(0.095)	(0.123)	(0.133)	(0.257)	(0.300)
Contract 1	0.182***	0.030	0.065	0.641***	0.602**	0.280
	(0.035)	(0.092)	(0.118)	(0.131)	(0.267)	(0.325)
Contract 3	-0.006	-0.076	-0.114	4.593***	12.573***	-1.114
	(0.202)	(0.536)	(0.715)	(0.866)	(1.806)	(2.443)
Cons	0.596***	0.783***	0.802***	0.806***	0.851	1.664**
	(0.039)	(0.143)	(0.183)	(0.268)	(0.554)	(0.705)
F	131.562	41.756	32.3195	87.626	22.415	14.074
Sargan	.000	.000	.000	.000	.000	.001

Source: Own elaboration using ENIGH2010. *** Statistically significant at 1%, ** Statistically significant at 5%, *Statistically significant at 10%. Standard errors between parenthesis.

Chapter 4

Household Backward Bending, Forward Falling, and Inverted S Labor Supply Curves: US and Mexico

4.1 Introduction

This chapter studies and compares the household LSC shapes of the American -developed- versus the Mexican -developing- economies.

The motivation for studying the household LSC is well known; in addition to the substitution and income effect observed in the individual case, it includes own and cross effects, representing in a more complete way the reaction of society after a change in real wages.

But, which is the shape of the household LSC? The economic literature has been advocated to study cross effects at the interior of households, but no specific shape has been proposed for the household LSC[1]. In order to answer this question, we set the working hours of all the members of a household as a function of the

[1]One exception is Dessing (2001) that discusses the inverted S LSC for it. She presents a model where a family maximizes a joint utility function. Although the paper presents a complete intuitive discussion, the author does not specify the utility function that the family is maximizing, so no formal specific conclusions can be derived from the mathematical model except by the fact that, given the subsistence constraint the the family faces, the LSC of the family should have a negative slope at low wages.

most relevant monthly real wage for it -the largest one-, whose receiver is considered the economic head of the household, considering this way all the members of a household as a unit.

Our evidence suggests that regardless of the underlying assumption of homogeneous or heterogeneous units of labor -that is, disaggregating or not the labor market by levels of education-, the American and Mexican observed Household LSCs present a backward bending (inverted C) and forward falling (C) shapes respectively. Although, if a cubic functional form is allowed in the Mexican case, an inverted S shape is also observed.

The negative slope observed in the Mexican LSCs at low wages implies the existence of a survival constraint. This constraint is not observed in the more developed American economy, where the average wage range by deciles starts on the top of the developing Mexican one.

With the target of providing a structural justification to the shapes of the household LSCs found in the data, we presented in chapter 2 the first static structural model able to replicate all of them, arriving to a close form solution.

As already stated, the economic literature has been advocated to study cross effects at the interior of households. Among others, Heckman (1974) found that the wife's asking wage increases by five percent each time that the husband's wage increases one dollar, Lundberg (1988) found that families that have young children also have negative cross earnings effects, and Murphy (1997) found that women married with middle and high wage men have received larger employment and earning gains. So, although the relationship among wages and working hours of different members of the same household has been already studied, a conclusion about the shape of the household LSC is still missing.

One of the shapes that we find for the Mexican household LSC, the inverted S, has already been discussed in an individual framework. Sharif (2000) and Nakamura and Murayama (2010). The last authors try to model it by assuming a decreassing elasticity of substitution and the use of a shift in the utility function.

In the topic of the inverted S shape household LSC this dissertation contributes by: a) Presenting empirical evidence of its existence in a developing economy. So far, just the negative slope segment at low wages has been statistically-econometrically proved, Sharif (2000) and Dessing (2001). That is, the complete inverted S shape exists in the economic literature only as an intuitive discussion, a speculated shape that nobody has proved to be observed using true data, and b) By providing a theoretical static structural model able to generate it.

In sections 2.2 and 2.3.1 we already presented static structural models able to generate in a household framework a backward bending, forward falling, and inverted S LSC shapes. Section 4.2 describes the datasets we use. Section 4.3 presents the results of estimating the LSCs. Section 4.4 discusses some economic implications of the LSC shapes that we found. Section 4.5 concludes and section 4.6 contains tables and figures.

4.2 The Data

The observed LSCs presented in this paper were generated using two datasets, both of them publicly available on the internet. For the American case we use the widely known NLSY79, while for the Mexican case we use ENIGH2010[2].

4.2.1 The American Dataset

The National Longitudinal Survey of Youth 1979 (NLSY79) dataset is an American representative sample of 12,686 persons who were between 14 and 22 years old in 1979, when they were surveyed for the first time. This survey is conducted by the US Bureau of Labor Statistics. Interviews were conducted every year from 1979 to 1994, after which they took place every two years.

4.2.2 The Mexican Dataset

ENIGH2010 (Encuesta Nacional de Ingresos y Gastos de los Hogares 2010, Income and Expenditure Household National Survey 2010) is a national represen-

[2]Publicly available at http://www.inegi.org.mx/est/contenidos/Proyectos/Encuestas/Hogares/regulares/Enigh/default.aspx

tative household survey, generated every two years by the Mexican National Institute of Statistics, Geography and Information (INEGI). ENIGH2010 includes 27,087 surveyed households; once each one is multiplied by its respective expansion factor it represents a total of 28,513,038 households, including a total of 112,739,699 persons, that is, the total Mexican population.

4.3 Estimated Labor Supply Curves

In this section we present our results of estimating the Household American and Mexican LSCs. In doing so, we follow four different approaches, we consider both homogeneous and heterogeneous units of labor, and we consider and not sample selection bias. By way of explanation, the standard assumption is considering homogeneous units of labor, where workers are considered able to perform the duties of any job, but with different efficiency levels. With this, it is possible to estimate a LSC includying all individuals in a given dataset.

We perform our heterogeneous analysis by disaggregating the dataset by levels of education of the head of the household, so household heads with different levels of education belong to different labor markets. This last approach is more realistic in the sense that for certain jobs more years of education are required.

Given the endogeneity of wages in the labor market, the use of Instrumental Variables (IV) is required. The perfect instrument would be a variable highly correlated with the wage but not included in the error term of the working hours equation at the individual level. Unfortunately, every variable has certain degree of endogeneity and correlation with other variables, thus, the perfect instrument does not exist. Despite this fact, it is possible to find acceptable instrument variables with different levels of endogeneity, so its use in separate regressions allows the researcher to verify the consistency of the results.

It is also worth noticing that although it is possible to check the correlation between the endogenous regressor and the IV, the case is not the same for the validity of the IV. Tests of overidentifying restrictions -as Sargan test-, are usually interpreted as tests for checking the validity of instruments. This idea is misleading (Deaton 2010) (Parente and Santos Silva 2011), because ”The tests check the coherency of the instruments rather than their validity”[3].

Some aspects of our methodology and results worth being pointed out: a) We propose a set of IV for both economies, obtaining similar results using them separately. b) All our regressions were estimated using Two Step Least Squares (2SLS), in the first step the wage is estimated and in the second one the results are used for estimating working hours. c) Our qualitative results demonstrate to be consistent regardless of the inclusion of corner solutions or not. All the estimations of the Mexican and American household LSCs are presented considering and not sample selection bias. d) Considering demographic characteristics other than sex, such as rural-urban and region is relevant in Mexico, but its inclusion in the American regressions results statistically non-significative. We believe the reason is that there exist huge differences on wages among regions in Mexico, but American wages are, relatively speaking, more homogeneous among urban and rural areas and regions. Maybe it is enough to say that, according to official statistics, the difference on GDP per capita between Mexico city and the poorest states in the south of the country -Oaxaca and Chiapas- was around 500.0% by 2005.

4.3.1 Estimated American Labor Supply Curves

For the American case we use as IV the size of the firm where the head of the household works (Size F 50-500H and Size F more 500H), the condition if the firm has more than one location (MOneLocH), the median and the mean of the economy wage of the head of the household (WEconMedH and WEconMeanH), as well as the square of the last two IV (WEconMedsqH and WEconMeansqH) that corresponds to the level of education and industry for each specific household head.

For the observations that correspond to a head that does not work -corner solution- in tables 4.1.2, 4.2.2 and 4.3.2, the economy wage corresponds to agents with the same level of education, given that there is not industry related to them.

The intuition of using market wages (WEconMedH, WEconMeanH, WEcon-

[3]Parente and Santos Silva 2011.

MedsqH and WEconMeansqH) as instruments consists in the fact that the market wage should be highly correlated with the individual wage -household's head wage-, but how many working hours a household offers only depends on the head's wage, so, it is not in the error term at the household level. Also, if the mean or median of the economy wage is correlated with the wage of the agent -household's head-, then the square of the former should be also correlated with the square of the latter. The last IV allows us to estimate a quadratic functional form.

For estimating American household LSCs we only use those observations of NLSY79 where the household head is the respondant in the survey. This because the variables industry, size of the firm, and more than one location do not exist for the spouse/partner of the respondant; so we can not generate the required IV for estimating the LSC of those households where the head is the spouse/partner of the respondant.

Tables 4.1.1 and 4.1.2 present the results of considering homogeneous units of labor. In the first one, the results of seven econometric regressions, with different combinations of IV, are displayed. As we can observe in both tables, the backward bending LSC is supported by the fact that $\hat{w}head$ and $\hat{w}head^2$ present a positive and negative sign respectively, both of them being statistically significant at 1 % in most cases.

[Tables 4.1.1 and 4.1.2 here]

The results of estimating the LSC for the heterogeneous cases are presented in tables 4.2.1 to 4.3.2. Where E $\leq$ HS means Education not more than high school —at most 12 years of education—, E in HS states for education in high school —not less than 10 and not more than 12 years of education—, E = HS means graduated from high school —exactly 12 years of education—, E in C refers to education in college —not more than 16 and not less than 13 years of education—, E = C states for graduated from college —exactly 16 years of education—, and E in GS means education in graduate school —not less than 17 years of education—.

For consistency, regarding the heterogeneous units of labor case, tables 4.2.1 to 4.3.2 and 4.6.1 to 4.7.2, refer to the same levels of education with different IV and exogenous variables -with the exception of the first column on tables 4.6.1 to 4.7.2, where education less or equal to secondary school is considered in the Mexican case-. Tables 4.2.1 to 4.3.2 refer to the American and tables 4.6.1 to 4.7.2 to the Mexican case.

[Tables 4.2.1 to 4.3.2 here]

As we can observe in tables 4.2.1 to 4.3.2, if a quadratic functional form is estimated, the data supports a backward bending shape, that is, the coefficient of $\hat{w}head$ is positive and $\hat{w}head^2$ is negative.

4.3.2 Estimated Mexican Labor Supply Curves

Tables 4.4.1 to 4.5.2 contain the regressions regarding the homogeneous units of labor case of the Mexican economy. Tables 4.4.2 and 4.5.2 contain the same regressions as tables 4.4.1 and 4.5.1 respectively, but considering sample selection bias -corner solutions where the head does not work[4]-.

As we can observe, if a quadratic functional form is estimated (tables 4.4.1 and 4.4.2), the coefficient of $\hat{w}head$ is negative and $\hat{w}head^2$ is positive, all of them statistically significant at 1%, suggesting the existence of a forward falling (C) LSC. Although, if a cubic functional form is estimated (tables 4.5.1 and 4.5.2), an inverted S shape is also supported by the data. Given the level of significance of the coefficients and the values of the Minimum eigenvalue statistics it is clear that the quadratic functional form fits the data in a better way.

The heterogeneous units of labor cases are presented in tables 4.6.1 to 4.7.2. Tables 4.6.2 and 4.7.2 contain the same regressions as tables 4.6.1 and 4.7.1 respectively, but considering sample selection bias. As we can observe , if a quadratic functional form is estimated the data supports a forward falling shape,

[4]In those cases, in order to identify the head of each household we use a variable of ENIGH 2010 that identifies them.

that is, the coefficient of $\hat{w}head$ is negative and $\hat{w}head^2$ is positive.

As way of explanation, on tables 4.7.1 and 4.7.2 the IV are the median (WEconMed) and the square of the mean (WEconMeansq) of the wage in the Mexican economy of agents that have the same number of years of education and work for the same industry than the head of each household. For those observations that correspond to a head that does not work, tables 4.4.2, 4.5.2, 4.6.2 and 4.7.2, the economy wage corresponds to agents with the same level of education, given that there is not industry related to them.

[Tables 4.4.1 to 4.7.2 here]

4.4 The Economic Implications of the LSC Shapes

Our results have non trivial implications on optimal economic policies:

4.4.1 The Economic Implications of the American LSC shapes

The fact that the observed American household LSC presents an inverted C shape has policy implications. If the target consists in incentivating the population with the highest wages to work more, then the optimal policy would be to increase these taxes.

4.4.2 The Economic Implications of the Mexican LSC shapes

The differences in optimal economic policies between a positively and a negatively-sloped LSC are not trivial, and additional research is required in some topics. The economic theory states that if the MW is set below the equilibrium in a competitive market, where a backward bending LSC is observed, there is no effect on wages. But if the MW is above the equilibrium, the optimal policy, in order to reduce the unemployment rate, is to decrease the MW. The last idea is not necessarily true with a forward falling or inverted S LSCs.

Figure 4.1 exposes the previous discussion. Figure 4.1.a shows the optimal policy considering the backward bending shape: if the Minimum Wage is on level D, the corresponding unempolyment is the difference between B and A, so if the MW is reduced to D' the corresponding level of unemployment is reduced -given that the MWs are above the intersection of the demand and supply labor curves, that is, the equilibrium point- to the horizontal distance between B' and A'. Nevertheless, the optimal policy could be the opposite under an inverted S shape LSC; as we can see on figure 4.1.b, if the level of the MW is D the corresponding unemployment is the horizontal distance between B and A, if the MW is reduced to D' the unemployment is increased, achieving a level equal to the horizontal line between B' and A'. Given that we arrive to a set of multiple equilibria, where the offer is to the right of the demand, additional research is required in the last case.

[Figure 4.1 here]

So far it is enough to say that, since the Mexican observed LSC is not the backward bending LSC assumed by the Mexican government, the labor policy regarding the MW during the last decades -to reduce the real MW in order to reduce the unemployment rate- is not necessarily the optimal one, and aditional research is required in order to define the optimal policy.

It is worth noticing another fact, out of the scope of this dissertation, about the economic implications between the inverted S shape and the MW. If we take into account that the MW is considered the benchmark in the labor market, and because of that a large fraction of wages are set as multiples of the MW (Fairris, Popli and Zepeda 2008), then a reduction of the MW will increase the unemployment not only of those that earn one MW but also of all those workers that earn a multiple of the MW and whose wages correspond to the negative slope of the LSC.

Given that, as stated before, intuitively speaking the forward falling and inverted S shapes suggest that a reduction in the wage of the Household's head provokes other members of the same Household to enter into the job market or to offer more working hours, a time constraint is added for attending school to members of households that belong to education stages when real wages are decreased, exacerbating poverty cycles.

Given that the Mexican individual LSC presents a forward falling shape and the household LSC presents also a forward falling and an inverted S shapes, if the target is to reduce unemployment, it could be optimal for policy makers to increase low wages through different market incentives, as the Minimum Wages.

4.5 Conclusions

This chapter is devoted to find and compare the shapes of the household LSCs of the American -developed- and Mexican -developing- economies, and to discuss some economic implications of the same.

Our evidence suggests that while the American observed Household LSC follows a backward bending shape, the Mexican one presents a forward falling shape, although if a cubic functional form is allowed, an inverted S shape is also supported by the data.

While estimating the household LSC shapes, the importance of considering demographic characteristics becomes evident for the Mexican economy, where there exist huge regional differences. The American economy presents, relatively speaking, more uniform regional labor markets.

With the target of providing a structural justification to the shape of the household LSCs found in the data, we presented in chapter 2 a static structural model able to replicate all of them.

Our results have implications on optimal economic policies. In order to reduce the unemployment rate, at low wage levels, the minimum wage should be decreased under a backward bending shape. While the optimal policy is not clear with a forward falling or inverted S LSCs, thusly, additional research is needed in this issue.

The forward falling and inverted S shapes of the household LSC also add a time constraint for achieving higher levels of education to agents that belong to households with low wages, given that these agents, of any age, should allocate more time in the job market. This conclusion is important in terms of public policies, because it demonstrates that to provide the population with free public education -this is the Mexican policy- is not enough to break poverty cycles.

The fact that the observed American household LSCs present a backward bending shape, instead of only a positive slope, also has policy implications. If the target consists in incentivating the population with the highest wages to work more, then the optimal policy under an only positive slope LSC requires to decrease their labor taxes, while if the observed LSCs present a backward bending shape the optimal policy would be to increase these taxes.

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4.6 Tables and Figures

Figure 4.1 Possible implications of the minimum wage
with a backward bending and an inverted S LSC

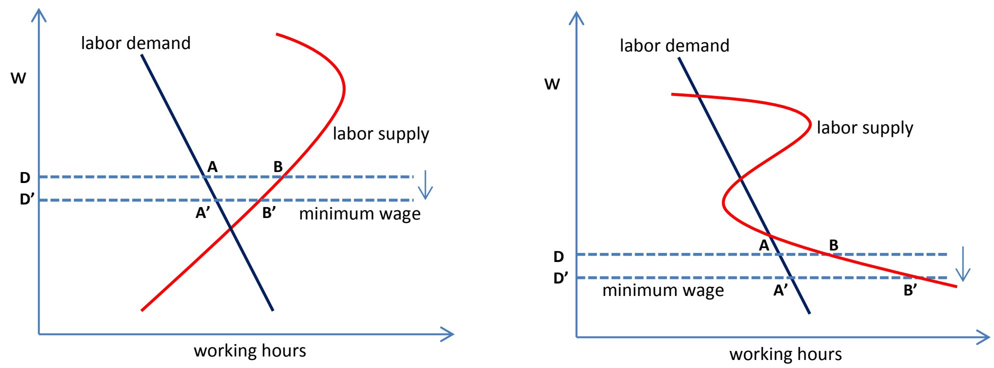

Figure 4.1.a **Figure 4.1.b**

Table 4.1.1 U.S., Household, Homogeneous Units of Labor

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Dep. var.: h. fam.							
ŵhead	**.981*****	**.420*****	**.443*****	**.436*****	**.625*****	**.687*****	**.678*****
	(.187)	(.123)	(.114)	(.113)	(.111)	(.127)	(.125)
ŵhead^2	**-.005*****	**-0.001**	**-.001***	**-.001***	**-.003*****	**-.003*****	**-.003*****
	(.001)	(0.001)	(.001)	(0.001)	(.001)	(.001)	(.001)
sex2H		-8.553***	-8.039***	-6.875***	-7.248***	-6.989***	-6.981***
		(0.820)	(.857)	(.854)	(.921)	(.982)	(.976)
Marita10				-2.712***			
				(.293)			
Cons	36.274***	48.379***	47.777***	51.650***	45.173***	43.853***	44.020***
	(2.827)	(2.236)	(2.158)	(2.196)	(2.023)	(2.417)	(2.393)
End. reg. whead							
WEconMedH	1.619***	.017	.087	.089	1.490***		
	(.118)	(.103)	(.112)	(.112)	(.127)		
WEconMedsqH	-.005***				-.004**		
	(.001)				(0.002)		
WEconMeanH		1.083***	1.014***	01.006***		.963***	.934***
		(0.085)	(.093)	(.093)		(.130)	(.130)
WEconMeansqH						0.001	.001
						(0.002)	(.002)
MOneLocH			3.823***	3.804***			3.050***
			(1.015)	(1.015)			(1.034)
Size F 50-500H					2.544**	2.663***	2.200**
					(1.012)	(.999)	(1.015)
Size F more 500H					5.018***	5.283***	4.624***
					(1.324)	(1.304)	(1.325)
Sex2H		-2.839***	-3.250***	-2.895***	-3.309***	-3.471***	-3.520***
		(0.858)	(.911)	(.925)	(.922)	(.908)	(.912)
Marita10				-.837**			
				(.369)			
Cons	-3.831**	.112	-1.949	-.675	-2.247	.917	-.385
	(1.784)	(1.089)	(1.335)	(1.445)	(1.982)	(2.232)	(2.288)
End. reg whead^2							
WEconMedH	112.925***	-94.404***	-98.167***	-97.895***	102.333**		
	(36.247)	(31.809)	(36.326)	(36.335)	(41.200)		
WEconMedsqH	.615				.843		
	(.477)				(.544)		
WEconMeanH		226.598***	229.856***	228.868***		51.095	48.731
		(26.309)	(30.088)	(30.113)		(42.410)	(42.719)
WEconMeansqH						1.392***	1.411***
						(.530)	(.533)
MOneLocH			339.280	337.562			304.331
			(328.755)	(328.921)			(338.868)
Size F 50-500H					427.051	406.990	364.855
					(328.918)	(326.651)	(332.634)
Size F more 500H					-111.219	-171.737	-237.404
					(430.303)	(426.428)	(434.135)
Sex2H		76.707	70.774	118.182	-11.269	-3.221	-6.067
		(265.794)	(295.269)	(299.885)	(299.500)	(297.134)	(298.74)
Marita10				-109.791			
				(119.595)			
Cons	-1049.717*	-2255.649***	-2496.591***	-2331.578***	-1129.134*	-966.643	-1109.519
	(546.659)	(337.312)	(432.606)	(468.322)	(644.083)	(730.059)	(749.725)
Min eig stat	7.671	10.413	7.119	7.123	5.363	6.086	4.874
Sargan			.300	0.277	.001	.002	.004

Source: Own elaboration using NLSY79. *** Statistically significant at 1%, ** Statistically significant at 5%, *Statistically significant at 10%. Standard errors between parenthesis.

Table 4.1.2 U.S., Household, Homogeneous Units of Labor, Considering Sample Selection Bias

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Dep. var.: h. fam.							
$\hat{w}$head	**.565*****	**.175**		**.176**	**.534*****		**.722*****
	(.221)	(.316)		(.307)	(.187)		(.175)
$\hat{w}$head^2	**-.003****	**-.000**		**-.000**	**-.003****		**-.004*****
	(.001)	(.002)		(.002)	(.001)		(.001)
sex2H		-6.721***		-5.401***	-6.238***		-5.382***
		(1.656)		(1.613)	(1.058)		(1.038)
Marita10				-3.085***			
				(.534)			
Cons	47.413***	57.734***		61.865***	50.762***		47.486***
	(4.617)	(7.265)		(7.154)	(3.834)		(3.504)
End. reg whead							
WEconMedH	1.878***	.005		.008	1.954***		
	(.209)	(.115)		(.115)	(.220)		
WEconMedsqH	-.008***				-.009***		
	(.002)				(.002)		
WEconMeanH				1.125***			1.336***
				(.096)			(.180)
WEconMeansqH							-.002
							(.002)
Sex2H		-3.454***		-3.003**	-4.576***		-3.727***
		(1.185)		(1.195)	(1.425)		(1.279)
Marita10				-1.011***			
				(.374)			
Cons	-10.238**	-1.975		-.507	-10.555**		-5.565
	(4.583)	(2.269)		(2.325)	(4.461)		(4.118)
End. reg whead^2							
WEconMedH	152.805**	-88.204**		-87.820**	160.965***		
	(64.099)	(37.680)		(37.743)	(61.343)		
WEconMedsqH	.323				.246		
	(.704)				(.689)		
WEconMeanH		247.024***		246.090***			81.937
		(31.481)		(31.550)			(55.781)
WEconMeansqH							1.004*
							(.602)
Sex2H		-318.569		-259.458	-184.568		109.158
		(386.010)		(389.697)	(397.265)		(396.854)
Marita10				-137.984			
				(122.284)			
Cons	-2137.67	-3514.39***		-3324.245***	-2282.286*		-1383.494
	(1413.16)	(736.219)		(755.567)	(1255.762)		(1282.86)

Source: Own elaboration using NLSY79. *** Statistically significant at 1%, ** Statistically significant at 5%, *Statistically significant at 10%. Standard errors between parenthesis.

Table 4.2.1 U.S., Household, Heterogeneous Units of Labor

Dep. var.: h	(1) E $\leq$ HS	(2) E in HS	(3) E = HS	(4) E in C	(5) E = C	(6) E in GS
$\hat{w}$head	**.942*** **	**.916*** **	**.481**	**.592*** **	**.132**	**.497**
	(.177)	(.183)	(.483)	(.161)	(.218)	(.449)
$\hat{w}$head^2	**-.003*** **	**-.002** **	**.002**	**-.002** **	**-.000**	**-.003**
	(.001)	(.001)	(.006)	(.001)	(.001)	002)
Cons	35.348***	35.677***	41.863***	41.147***	54.708***	50.409***
	(2.954)	(3.194)	(5.979)	(3.280)	(5.733)	0.821)
End. reg. whead						
WEconMean	.324	.040	-.262	.910***	-.166	1.341*
	(.563)	(.739)	(1.144)	(.277)	(1.201)	(.782)
WEconMeansq	.018	.024	.031	.002	.016	-.002
	(.014)	(.018)	(.028)	(.004)	(.015)	(.007)
Size F 50-500H	2.173**	2.483**	1.884*	3.686**	2.191	.770
	(1.103)	(1.162)	(1.050)	(1.693)	(3.749)	(4.885)
Size F more 500H	3.614**	3.798**	4.054***	6.316***	7.530*	7.318
	(1.591)	(1.679)	(1.467)	(2.022)	(4.107)	(6.241)
Cons	5.477	8.445	11.468	-.403	19.765	-8.242
	(5.556)	(7.375)	(11.280)	(4.798)	(22.084)	(18.740)
End. reg. whead^2						
WEconMean	-477.574***	-741.875***	-102.939	-3.616	-240.884	211.978
	(173.183)	(228.861)	(217.011)	(82.960)	(405.445)	(302.556)
WEconMeansq	15.641***	22.114***	4.695	2.324**	5.793	-.112
	(4.248)	(5.532)	(5.319)	(1.111)	(5.203)	(2.844)
Size F 50-500H	319.975	392.995	84.462	597.535	797.661	474.145
	(339.024)	(360.098)	(199.251)	(507.529)	(1265.481)	(1889.011)
Size F more 500H	-104.639	-66.517	-3.842	12.555	-32.723	-329.632
	(489.172)	(520.200)	(278.406)	(606.238)	(1386.583)	(2413.323)
Cons	3725.593**	6278.359***	804.971	-490.516	3320.958	-4960.446
	(1707.727)	(2284.663)	(2140.159)	(1438.482)	(7454.972)	(7246.941)
Min eig stat	6.247	7.4763	.860	3.995	1.474	.411
Sargan	.211	.305	.542	.087	.928	.859

Source: Own elaboration using NLST79. *** Statistically significant at 1%, ** Statistically significant at 5%, *Statistically significant at 10%. Standard errors between parenthesis.

Table 4.2.2 U.S., Household, Heterogeneous Units of Labor, Considering Sample Selection Bias

Dep. var.: h	(1) E $\leq$ HS	(2) E in HS	(3) E = HS	(4) E in C	(5) E = C	(6) E in GS
$\hat{w}$head	**1.052*** **	**.944*** **	**2.172**	**.902*** **	**-.116**	**-.448**
	(.200)	(.226)	(4.690)	(.319)	(.718)	(3.136)
$\hat{w}$head^2	**-.004*** **	**-.003*** **	**-.023**	**-.004** **	**.001**	**.002**
	(.001)	(.001)	(.070)	(.002)	(.004)	(.017)
Cons	36.896***	38.887***	32.506	35.292***	60.203***	72.675
	(4.209)	(5.194)	(33.472)	(8.112)	(14.591)	(95.101)
End. reg. whead						
WEconMean	.766	.737	1.139	.971**	.386	.268
	(.563)	(.801)	(1.233)	(.409)	(1.323)	(7.631)
WEconMeansq	.008	.008	-.004	.001	.010	.009
	(.014)	(.018)	(.030)	(.004)	(.018)	(.081)
Cons	2.421	3.064	.797	3.742	11.339	3.187
	(6.321)	(9.321)	(13.185)	(11.116)	(22.809)	(121.378)
End. reg. whead^2						
WEconMean	-422.172**	-677.695***	53.825	15.181	-118.875	-285.242
	(169.284)	(242.987)	(237.964)	(118.238)	(436.819)	(3213.619)
WEconMeansq	14.243***	20.364***	.262	2.004	4.152	5.297
	(4.097)	(5.636)	(5.718)	(1.275)	(5.797)	(34.204)
Cons	3384.475*	6016.503**	-192.290	-154.952	1751.696	304.954
	(1901.468)	(2827.908)	(2544.706)	(3223.711)	(7528.718)	(51115.34)

Source: Own elaboration using NLST79. *** Statistically significant at 1%, ** Statistically significant at 5%, *Statistically significant at 10%. Standard errors between parenthesis.

Table 4.3.1 U.S., Household, Heterogeneous Units of Labor

Dep. var.: h	(1) E ≤ HS	(2) E in HS	(3) E = HS	(4) E in C	(5) E = C	(6) E in GS
$\hat{w}$head	**1.201*** **	**1.224*** **	**1.472*** **	**.350***	**-.107**	**.496**
	(.151)	(.162)	(.284)	(.212)	(.650)	(.405)
$\hat{w}head^2$	**-.004*** **	**-.004*** **	**-.008*** **	**-.000**	**.001**	**-.003**
	(.001)	(.001)	(.003)	(.001)	(.004)	(.002)
Cons	31.018***	30.420***	28.762***	45.321***	59.272***	49.711***
	(2.621)	(2.916)	(4.198)	(4.074)	(15.115)	(10.040)
End. reg. whead						
WEconMed	.086	.080	-.125	.330*	-.060	.099
	(.178)	(.202)	(.341)	(.198)	(.481)	(.231)
WEconMeansq	.025***	.025***	.029***	.012***	.015***	.009***
	(.003)	(.004)	(.007)	(.002)	(.004)	(.002)
Cons	8.620***	8.900***	10.530***	12.193***	19.661**	22.451***
	(2.044)	(2.319)	(3.144)	(3.205)	(8.767)	(5.457)
End. reg. $whead^2$						
WEconMed	-249.883***	-290.442***	-174.820***	-59.463	-100.926	-64.668
	(51.502)	(58.731)	(66.269)	(56.870)	(155.919)	(83.139)
WEconMeansq	7.688***	8.525***	5.792***	2.744***	3.433**	2.286***
	(1.023)	(1.151)	(1.414)	(.570)	(1.142)	(.752)
Cons	1756.72***	2063.425***	1271.976**	707.475	989.433	1455.636
	(590.407)	(675.198)	(610.761)	(921.859)	(2840.514)	(1965.83)
Min eig stat	26.120	26.922	6.818	4.621	.453	1.179
Sargan						

Source: Own elaboration using NLSY79. *** Statistically significant at 1%, ** Statistically significant at 5%, *Statistically significant at 10%. Standard errors between parenthesis.

Table 4.3.2 U.S., Household, Heterogeneous Units of Labor, Considering Sample Selection Bias

Dep. var.: h	(1) E ≤ HS	(2) E in HS	(3) E = HS	(4) E in C	(5) E = C	(6) E in GS
$\hat{w}$head	**1.064*** **	**1.017*** **	**1.221*** **	**-.594**	**.229**	**.039**
	(.194)	(.238)	(.342)	(1.494)	(1.777)	(1.443)
$\hat{w}head^2$	**-.004*** **	**-.003*** **	**-.009*** **	**.004**	**-.001**	**.001**
	(.001)	(.001)	(.003)	(.008)	(.010)	(.010)
Cons	36.855***	37.758***	39.523***	72.456*	50.417	41.220
	(4.526)	(5.725)	(7.187)	(40.634)	(42.580)	(47.731)
End. reg. whead						
WEconMed	-.097	-.099	-.077	-.092	-.069	.800
	(.212)	(.249)	(.362)	(.626)	(.533)	(7.388)
WEconMeansq	.027***	.026***	.024***	.013***	.015**	-.003
	(.004)	(.004)	(.008)	(.005)	(.006)	(.111)
Cons	11.395***	12.061***	13.329***	27.130	22.612	58.142
	(3.680)	(4.502)	(4.479)	(16.790)	(15.263)	(335.767)
End. reg. $whead^2$						
WEconMed	-305.478***	-346.598***	-143.250**	-86.495	-115.404	127.699
	(63.446)	(74.909)	(69.556)	(83.677)	(176.508)	(1939.303)
WEconMeansq	8.501***	9.280***	4.280***	2.915***	3.398*	-.928
	(1.143)	(1.278)	(1.565)	(.633)	(1.998)	(29.204)
Cons	2466.162**	2799.69**	1634.915*	1556.928	2182.29	10535.1
	(1099.208)	(1353.465)	(861.009)	(2262.47)	(5047.064)	(88132.34)

Source: Own elaboration using NLSY79. *** Statistically significant at 1%, ** Statistically significant at 5%, *Statistically significant at 10%. Standard errors between parenthesis.

Table 4.4.1 Mexico, Household, Homogeneous Units of Labor, Quadratic Functional Form

	(1)	(2)	(3)	(4)
Dep. var.: h. fam.				
ŵhead	**-2.824*****	**-2.882*****	**-5.986*****	**-4.116*****
	(.430)	(.472)	(1.884)	(1.322)
ŵhead^2	**.047*****	**.060*****	**.194*****	**.127*****
	(.017)	(.020)	(0.054)	(.034)
w partner			-3.436*	-.575
			(1.826)	(1.273)
UrbRur1	4.480***		.582	
	(1.093)		(2.124)	
UrbRur2	5.848***		2.048	
	(1.253)		(2.419)	
UrbRur3	1.883		-2.395	
	(1.413)		(2.744)	
Region2	-1.226		-1.066	
	(.878)		(1.599)	
Region3	-7.288***		-10.553***	
	(.952)		(1.792)	
Cons	92.676***	93.735***	141.703***	103.229***
	(1.121)	(.912)	(2.399)	(1.278)
End. reg. whead				
WEconMedP			.468***	.387***
			(.043)	(.059)
WEconMedH	-.235***	-.164***	-.413***	1.158***
	(.087)	(.063)	(.138)	(.116)
WEconMeanH	1.196***	1.207***	1.164***	.074***
	(.049)	(.048)	(.077)	(.007)
WEconMedisqH	.008		.009	-.109***
	(.007)		(.011)	(.015)
UrbRur1	.447***		.221*	
	(.071)		(.120)	
UrbRur2	.218***		.181	
	(.083)		(.138)	
UrbRur3	.115		.091	
	(.094)		(.158)	
Region2	.340***		.322***	
	(.058)		(.091)	
Region3	.371***		.481***	
	(.063)		(.101)	
Cons	-.349***	.053	-.523***	-.060
	(.082)	(.042)	.140	(.150)

Table 4.4.1 Mexico, Household,
Homogeneous Units of Labor,
Quadratic Functional Form, Continued

End. reg. whead^2				
WEconMedP			1.747	-2.420
			(2.876)	(4.303)
WEconMedH	-80.717***	-52.258***	-57.393***	10.919
	(6.245)	(4.584)	(9.298)	(8.506)
WEconMeanH	65.506***	60.887***	52.986***	4.085***
	(3.534)	(3.462)	(5.195)	(.546)
WEconMediqH	3.366***		2.095***	-3.716***
	(.499)		(.719)	(1.098)
UrbRur1	4.272		-.422	
	(5.077)		(8.074)	
UrbRur2	2.638		.630	
	(5.957)		(9.266)	
UrbRur3	2.946		7.040	
	(6.765)		(10.606)	
Region2	7.783*		8.412	
	(4.193)		(6.147)	
Region3	6.330		17.381***	
	(4.548)		(6.771)	
Cons	-9.322	-25.373***	-19.164**	-6.152
	(5.903)	(3.017)	(9.438)	(10.975)
End. reg w partner				
WEconMedP			.756***	.766***
			(.038)	(.051)
WEconMedH			.106	.452***
			(.123)	(.101)
WEconMeanH			.200***	.013**
			(.069)	(.006)
WEconMedisqH			-.011	-.039***
			(.009)	(.013)
UrbRur1			.193*	
			(.107)	
UrbRur2			.085	
			(.123)	
UrbRur3			-.005	
			(.141)	
Region2			.185**	
			(.082)	
Region3			.072	
			(.090)	
Cons			-.305**	-.223*
			(.125)	(.130)
Min eig stat	81.688	89.969	10.566	6.535
Sargan	0.072		0.445	.619

Source: Own elaboration using ENIGH2010. *** Statistically significant at 1%, ** Statistically significant at 5%, *Statistically significant at 10%. Standard errors between parenthesis.

Table 4.4.2 Mexico, Household, Homogeneous Units of Labor, Quadratic Functional Form, Considering Sample Selection Bias

	(1)	(2)	(3)	(4)
Dep. var.: h. fam.				
ŵhead	**-1.046****	**-1.535*****	**-4.336*****	**-3.793*****
	(.478)	(.514)	(1.616)	(.969)
ŵhead^2	**-.001**	**.030**	**.139*****	**.118*****
	(.018)	(.021)	(.048)	(.025)
w partner			-3.637**	-.622
			(1.559)	(.934)
UrbRur1	3.893***		1.498	
	(1.116)		(1.842)	
UrbRur2	6.581***		3.732*	
	(1.286)		(2.110)	
UrbRur3	2.832*		-.295	
	(1.450)		(2.397)	
Region2	-1.377		-1.121	
	(.898)		(1.384)	
Region3	-8.314***		-11.080***	
	(.980)		(1.549)	
Cons	83.538***	84.875***	132.929***	101.734***
	(1.584)	(1.445)	(2.442)	(1.170)
End. reg. whead				
WEconMedP			.508***	.431***
			(.044)	(.060)
WEconMedH	.090	-.056	-.148	1.332***
	(.098)	(.068)	(.148)	(.121)
WEconMeanH	1.148***	1.193***	1.103***	
	(.052)	(.051)	(.081)	
WEconMeansqH				.070***
				(.008)
WEconMedisqH	-.017**		-.012	-.121***
	(.008)		(.011)	(.015)
UrbRur1	.434***		.303**	
	(.074)		(.124)	
UrbRur2	.296***		.331**	
	(.087)		(.143)	
UrbRur3	.198**		.235	
	(.099)		(.163)	
Region2	.345***		.318***	
	(.061)		(.094)	
Region3	.316***		.424***	
	(.066)		(.104)	
Cons	-1.216***	-.601***	-1.291***	-.726***
	(.125)	(.083)	(.179)	(.190)

Table 4.4.2 Mexico, Household, Homogeneous Units of Labor, Quadratic Functional Form, Considering Sample Selection Bias, Continued

End. reg. whead^2				
WEconMedP			2.835	-.917
			(2.914)	(4.345)
WEconMedH	-73.894***	-49.326***	-50.19***	16.999*
	(6.717)	(4.695)	(9.664)	(8.796)
WEconMeanH	64.483***	60.506***	51.316***	
	(3.571)	(3.493)	(5.258)	
WEconMeansqH				3.950***
				(.550)
WEconMedsqH	2.834***		1.515**	-4.145***
	(.535)		(.749)	(1.111)
UrbRur1	4.005		1.818	
	(5.097)		(8.141)	
UrbRur2	4.270		4.695	
	(6.008)		(9.407)	
UrbRur3	4.669		10.954	
	(6.818)		(10.734)	
Region2	7.902*		8.286	
	(4.210)		(6.176)	
Region3	5.167		15.828**	
	(4.584)		(6.822)	
Cons	-27.480***	-43.192***	-40.053***	-29.381**
	(8.697)	(5.835)	(11.848)	(13.783)
End. reg w partner				
WEconMedP			.766***	.770***
			(.038)	(.051)
WEconMedH			.169	.467***
			(.128)	(.104)
WEconMeanH			.185***	
			(.069)	
WEconMeansqH				.013***
				(.006)
WEconMedisqH			-.017*	-.041***
			(.010)	(.013)
UrbRur1			.213**	
			(.108)	
UrbRur2			.121	
			(.125)	
UrbRur3			.029	
			(.142)	
Region2			.184**	
			(.082)	
Region3			.058	
			(.090)	
Cons			-.489***	-.283*
			(.157)	(.163)

Source: Own elaboration using ENIGH2010. *** Statistically significant at 1%, ** Statistically significant at 5%, *Statistically significant at 10%. Standard errors between parenthesis.

Table 4.5.1 Mexico, Household, Homogeneous Units of Labor, Cubic Functional Form

	(1)	(2)	(3)	(4)	(5)
Dep. var.: h. fam.					
ŵhead	**-11.421***	**-10.592****	**-10.487****	**-3.489****	**-3.065*****
	(6.120)	(5.277)	(5.287)	(1.754)	(1.008)
ŵhead^2	**.965**	**.837**	**.836**	**.380*****	**.198*****
	(.615)	(.522)	(.524)	(.133)	(.061)
ŵhead^3	**-.009**	**-.007**	**-.007**	**-.005****	**-.002***
	(.006)	(.005)	(.005)	(.002)	(.001)
w partner				-7.715***	-2.365*
				(2.336)	(1.262)
UrbRur1		6.314***	6.260***		
		(2.086)	(2.090)		
UrbRur2		7.193***	7.073***		
		(2.099)	(2.103)		
UrbRur3		3.299	3.237		
		(2.318)	(2.324)		
Region2		-.661	-.683		
		(1.361)	(1.365)		
Region3		-6.595***	-6.600***		
		(1.496)	(1.500)		
Transfers			-.004*		
			(.002)		
Cons	102.737***	99.413***	99.584***	138.976***	103.256***
	(6.797	(4.898)	(4.922)	(1.961)	(1.030)
End. reg. whead					
WEconMedP				.472***	.380***
				(.042)	(.059)
WEconMedH	-.154**	-.149**	-.146**	-.361***	.124
	(.065)	(.065)	(.065)	(.101)	(.213)
WEconMedsqH					-.040**
					(.019)
WEconMeanH	1.169***	1.105***	1.110***	.659***	
	(.065)	(.065)	(.065)	(.173)	
WEconMeansqH	.004	.008*	.007*	.109***	.211***
	(.004)	(.004)	(.004)	(.032)	(.025)
WEconMeancubH				.006***	.010***
				(.002)	(.002)
UrbRur1		.452***	.451***		
		(.070)	(.070)		
UrbRur2		.221***	.215***		
		(.083)	(.083)		
UrbRur3		.116	.113		
		(.094)	(.094)		
Region2		.339***	.339***		
		(.058)	(.058)		
Region3		.371***	.372***		
		(.063)	(.063)		
Transfers			-.000**		
			(.000)		
Cons	.095	-.320***	-.315***	.357**	.776***
	(.063)	(.082)	(.082)	(.182)	(.208)

Table 4.5.1 Mexico, Household, Homogeneous Units of Labor, Cubic Functional Form, Continued

End. reg. whead^2					
WEconMedP				1.904	-2.795
				(2.855)	(4.297)
WEconMedH	-43.386***	-43.293***	-43.099***	-38.177***	-43.807***
	(4.627)	(4.631)	(4.632)	(6.777)	(15.641)
WEconMedsqH					-.076
					(1.402)
WEconMeanH	23.894***	22.900***	23.173***	-6.828	
	(4.634)	(4.671)	(4.674)	(11.591)	
WEconMeansqH	3.604***	3.666***	3.647***	10.700***	11.314***
	(.301)	(.304)	(.304)	(2.183)	(1.819)
WEconMeancubH				-.494***	-.527***
				(.116)	(.127)
UrbRur1		7.175	7.122		
		(5.055)	(5.055)		
UrbRur2		4.124	3.809		
		(5.933)	(5.936)		
UrbRur3		3.540	3.367		
		(6.744)	(6.744)		
Region2		7.486*	7.494*		
		(4.182)	(4.182)		
Region3		5.996	6.077		
		(4.536)	(4.536)		
Transfers			-.014*		
			(.008)		
Cons	14.310***	6.544	6.863	36.356***	38.093**
	(4.478)	(5.883)	(5.886)	(12.197)	(15.258)
End. reg. whead^3					
WEconMedP				-403.277	-801.564*
				(274.8)	(421.583)
WEconMedH	-4215.407***	-4212.906***	-4194.926***	-2271.215***	-3400.067**
	(524.766)	(525.250)	(525.393)	(652.307)	(1534.618)
WEconMedsqH					24.679
					(137.559)
WEconMeanH	1036.613**	966.831*	992.062*	-1458.429	
	(525.539)	(529.797)	(530.088)	(1115.637)	
WEconMeansqH	391.533***	396.122***	394.306***	859.801***	825.999***
	(34.191)	(34.503)	(34.526)	(210.078)	(178.46)
WEconMeancubH				-42.864***	-42.757***
				(11.215)	(12.422)
UrbRur1		566.864	561.902		
		(573.319)	(573.315)		
UrbRur2		403.666	374.612		
		(672.899)	(673.200)		
UrbRur3		449.649	433.67		
		(764.806)	(764.871)		
Region2		510.560	511.358		
		(474.350)	(474.339)		
Region3		333.583	341.036		
		(514.452)	(514.467)		
Transfers			-1.268		
			(.903)		
Cons	2683.633***	2095.974***	2125.357***	3601.437***	3282.156**
	(507.855)	(667.223)	(667.534)	(1173.921)	(1497.057)
End. reg w partner					
WEconMedP				.766***	.765***
				(.038)	(.051)
WEconMedH				-.015	.325*
				(.090)	(.185)
WEconMedsqH					-.031*
					(.017)
WEconMeanH				.365**	
				(.154)	
WEconMeansqH				-.021	.030
				(.029)	(.021)
WEconMeancubH				.001	-.001
				(.001)	(.001)
Cons				-.184	-.120
				(.162)	(.181)
Min eig stat	1.136	1.280	1.277	1.646	1.094
Sargan				.027	.029

Source: Own elaboration using ENIGH2010. *** Statistically significant at 1%, ** Statistically significant at 5%, *Statistically significant at 10%. Standard errors between parenthesis.

Table 4.5.2 Mexico, Household, Homogeneous Units of Labor, Cubic Functional Form, Considering Sample Selection Bias

	(1)	(2)	(3)	(4)	(5)
Dep. var.: h. fam.					
ŵhead	**-11.395*****	**-10.601*****	**-10.503*****	**-1.625**	**-2.999*****
	(3.827)	(3.632)	(3.525)	(1.469)	(1.019)
$\hat{w}head^2$	**.979*****	**.870*****	**.797****	**.398*****	**.223*****
	(.351)	(.327)	(.328)	(.110)	(.066)
$\hat{w}head^3$	**-.009*****	**-.008*****	**-.007****	**-.006*****	**-.002***
	(.003)	(.003)	(.003)	(.002)	(.001)
w partner				-9.047***	-3.021**
				(1.853)	(1.283)
UrbRur1		6.298***	6.245***		
		(1.441)	(1.385)		
UrbRur2		7.509***	6.881***		
		(1.333)	(1.362)		
UrbRur3		3.656**	2.963**		
		(1.485)	(1.502)		
Region2		-.676	-.644		
		(.937)	(.914)		
Region3		-6.845***	-6.419***		
		(1.130)	(1.037)		
Transfers			.001		
			(.004)		
Cons	101.628***	97.302***	101.086***	132.964***	105.184***
	(6.524)	(5.465)	(4.140)	(2.402)	(1.590)
End. reg. whead					
WEconMedP				.516***	.418***
				(.044)	(.059)
WEconMedH	-.067	-.067	-.078	-.272***	.481**
	(.069)	(.069)	(.068)	(.106)	(.223)
WEconMedsqH					-.064***
					(.020)
WEconMeanH	1.273***	1.215***	1.222***	1.029***	
	(.070)	(.070)	(.070)	(.187)	
WEconMeansqH	-.008*	-.004	-.003	.031	.181***
	(.005)	(.005)	(.005)	(.036)	(.025)
WEconMeancubH				-.002	-.008***
				(.002)	(.002)
UrbRur1		.448***	.460***		
		(.074)	(.072)		
UrbRur2		.308***	.256***		
		(.087)	(.085)		
UrbRur3		.205**	.163*		
		(.099)	(.096)		
Region2		.346***	.344***		
		(.061)	(.060)		
Region3		.314***	.349***		
		(.066)	(.065)		
Transfers			-.001***		
			(.000)		
Cons	-.730***	-1.153***	-.859***	-.655***	.022
	(.106)	(.122)	(.133)	(.239)	(.253)

Table 4.5.2 Mexico, Household, Homogeneous Units of Labor, Cubic Functional Form, Considering Sample Selection Bias, Continued

End. reg. whead^2					
WEconMedP				3.077	-1.509
				(2.902)	(4.289)
WEconMedH	-41.363***	-41.381***	-41.618***	-35.812***	-31.947**
	(4.700)	(4.700)	(4.742)	(6.876)	(16.181)
WEconMedsqH					-.865
					(1.427)
WEconMeanH	26.339***	25.448***	25.613***	3.071	
	(4.724)	(4.768)	(4.943)	(12.197)	
WEconMeansqH	3.331***	3.392***	3.423***	8.611***	10.297***
	(.314)	(.318)	(.338)	(2.322)	(1.840)
WEconMeancubH				-.394***	-.463***
				(.122)	(.128)
UrbRur1		7.096	7.320		
		(5.079)	(5.065)		
UrbRur2		6.147	4.698		
		(5.995)	(5.973)		
UrbRur3		5.597	4.441		
		(6.807)	(6.791)		
Region2		7.655*	7.603*		
		(4.204)	(4.190)		
Region3		4.668	5.569		
		(4.577)	(4.556)		
Transfers			-.041**		
			(.019)		
Cons	-4.931	-12.813	-4.944	9.288	12.973
	(7.372)	(8.463)	(9.641)	(15.707)	(18.398)
End. reg. whead^3					
WEconMedP				-369.008	-760.215*
				(277.877)	(420.018)
WEconMedH	-4192.295***	-4193.511***	-4163.31***	-2202.135***	-3029.141*
	(529.317)	(529.4973)	(536.451)	(657.683)	(1584.675)
WEconMedsqH					.894
					(139.796)
WEconMeanH	1064.55**	992.676*	1044.165*	-1169.283	
	(532.1716)	(537.317)	(559.490)	(1167.988)	
WEconMeansqH	388.411***	393.335***	389.529***	798.800***	792.230***
	(35.451)	(35.839)	(38.233)	(222.374)	(180.205)
WEconMeancubH				-39.989***	-40.624***
				(11.731)	(12.508)
UrbRur1		566.060	566.138		
		(573.216)	(573.392)		
UrbRur2		424.193	393.583		
		(676.57)	(676.231)		
UrbRur3		470.515	456.598		
		(768.116)	(768.786)		
Region2		512.281	513.668		
		(474.299)	(474.319)		
Region3		320.104	330.176		
		(516.499)	(515.726)		
Transfers			-1.856		
			(2.214)		
Cons	2463.82***	1899.622**	1873.215*	2810.792*	2510.42
	(832.648)	(956.030)	(1094.434)	(1506.253)	(1802.56)
End. reg w partner					
WEconMedP				.778***	.764***
				(.038)	(.051)
WEconMedH				.008	.350*
				(.091)	(.192)
WEconMedsqH					-.033*
					(.017)
WEconMeanH				.461***	
				(.162)	
WEconMeansqH				-.041	.028
				(.031)	(.022)
WEconMeancubH				.002	-.001
				(.002)	(.001)
Cons				-.448**	-.158
				(.209)	(.218)

Source: Own elaboration using ENIGH2010. *** Statistically significant at 1%, ** Statistically significant at 5%, *Statistically significant at 10%. Standard errors between parenthesis.

Table 4.6.1 Mexico, Household, Heterogeneous Units of Labor, Quadratic Functional Form

Dep. var.: h	(1) E ≤ Sec	(2) E in HS	(3) E = HS	(4) E in C	(5) E = C	(6) E in GS
ŵhead	**-5.878****	**-6.764****	**-7.892****	**-4.407*****	**-9.081*****	**-5.143*****
	(2.778)	(3.087)	(3.578)	(1.184)	(1.774)	(1.241)
ŵhead²	**.121****	**.337***	**.441****	**.066**	**.130****	**.077*****
	(.057)	(.181)	(.185)	(.059)	(.064)	(.023)
Cons	99.138***	101.207***	102.815***	99.273***	122.452***	107.216***
	(4.450)	(5.614)	(7.051)	(3.093)	(6.877)	(5.839)
End. reg. whead						
WEconMed	-.391***	.058	.113	-.046	-.264	.154
	(.131)	(.218)	(.297)	(.158)	(.247)	(.157)
WEconMeansq	.350***	.174***	.153***	.141***	.140***	.063***
	(.016)	(.028)	(.036)	(.017)	(.026)	(.008)
Cons	1.426***	1.454***	1.476***	2.013***	2.876***	3.215***
	(.141)	(.240)	(.330)	(.239)	(.520)	(.482)
End. reg. whead²						
WEconMed	-73.814***	-25.158***	-34.168***	-30.950***	-41.822***	-44.067***
	(6.459)	(7.711)	(11.204)	(9.175)	(15.804)	(13.453)
WEconMeansq	18.679***	5.210***	6.081***	5.540***	5.955***	5.181***
	(.786)	(.991)	(1.360)	(1.001)	(1.689)	(.669)
Cons	53.037***	26.533***	36.733***	40.576***	71.628**	88.152**
	(6.909)	(8.455)	(12.448)	(13.918)	(33.309)	(41.441)
Min eig stat	125.551	10.430	9.123	8.801	4.456	17.248
Sargan						

Source: Own elaboration using ENIGH2010. *** Statistically significant at 1%, ** Statistically significant at 5%, *Statistically significant at 10%. Standard errors between parenthesis.

Table 4.6.2 Mexico, Household, Heterogeneous Units of Labor, Quadratic Functional Form, Considering Sample Selection Bias

Dep. var.: h	(1) E ≤ Sec	(2) E in HS	(3) E = HS	(4) E in C	(5) E = C	(6) E in GS
ŵhead	**7.078****	**-.928**	**-3.847**	**-.655**	**-5.241*****	**-4.046*****
	(3.350)	(3.215)	(3.424)	(1.422)	(1.680)	(1.069)
ŵhead²	**-.138****	**.099**	**.298***	**-.022**	**.111***	**.061*****
	(.067)	(.180)	(.170)	(.066)	(.063)	(.021)
Cons	71.008***	85.905***	91.374***	79.790***	95.647***	95.316***
	(5.954)	(6.711)	(7.603)	(4.426)	(6.540)	(5.063)
End. reg. whead						
WEconMed	-.507***	.213	.251	.185	-.284	.271
	(.153)	(.252)	(.331)	(.174)	(.268)	(.171)
WEconMeansq	.352***	.169 ***	.146***	.145***	.180***	.061***
	(.016)	(.029)	(.037)	(.018)	(.030)	(.008)
Cons	1.615***	1.132***	1.200***	.616*	1.224*	1.804***
	(.193)	(.348)	(.438)	(.351)	(.679)	(.632)
End. reg. whead²						
WEconMed	-81.377***	-26.544 ***	-35.552***	-25.093***	-42.335***	-41.421***
	(7.535)	(8.794)	(12.418)	(9.574)	(16.013)	(13.710)
WEconMeansq	18.843***	5.259***	6.147***	5.633***	6.989***	5.143***
	(.793)	(1.002)	(1.383)	(1.017)	(1.814)	(.674)
Cons	65.552***	29.410**	39.506**	5.123	29.606	55.420
	(9.478)	(12.183)	(16.447)	(19.649)	(41.483)	(51.269)

Source: Own elaboration using ENIGH2010. *** Statistically significant at 1%, ** Statistically significant at 5%, *Statistically significant at 10%. Standard errors between parenthesis.

Table 4.7.1 Mexico, Household, Heterogeneous Units of Labor, Quadratic Functional Form

Dep. var.: h	(1) E ≤ Sec	(2) E in HS	(3) E = HS	(4) E in C	(5) E = C	(6) E in GS
ŵhead	**-3.595****	**-6.184****	**-4.269**	**-4.682*****	**-8.950*****	**-2.304*****
	(1.835)	(2.683)	(2.950)	(.928)	(1.780)	(.810)
ŵhead^2	**.093****	**.359**	**.267**	**.101****	**.182*****	**.034****
	(.037)	(.303)	(.369)	(.042)	(.058)	(.014)
Cons	77.667***	84.365***	80.354***	85.030***	104.364***	80.425***
	(2.928)	(4.216)	(4.730)	(2.493)	(7.023)	(3.935)
End. reg. whead						
WEconMed	-.445***	.522**	.952***	-.211	-.477*	.141
	(.154)	(.243)	(.331)	(.181)	(.283)	(.173)
WEconMeansq	.363***	.094***	.032	.161***	.160***	.063***
	(.018)	(.032)	(.041)	(.020)	(.030)	(.009)
Cons	1.461***	1.119***	.745**	2.252***	3.264***	3.396***
	(.166)	(.260)	(.359)	(.276)	(.607)	(.538)
End. reg. whead^2						
WEconMed	-78.667***	-8.895	-7.151	-36.847***	-49.836***	-47.659***
	(7.747)	(7.870)	(11.512)	(10.926)	(18.774)	(15.410)
WEconMeansq	19.347***	2.250**	1.915	6.301***	6.771***	5.507***
	(.889)	(1.034)	(1.430)	(1.186)	(2.006)	(.767)
Cons	57.752***	14.344*	13.315	48.138***	85.786**	96.969**
	(8.368)	(8.445)	(12.518)	(16.680)	(40.258)	(47.846)
Min eig stat	103.183	1.847	.959	7.613	3.929	15.627
Sargan						

Source: Own elaboration using ENIGH2010. *** Statistically significant at 1%, ** Statistically significant at 5%, *Statistically significant at 10%. Standard errors between parenthesis.

Table 4.7.2 Mexico, Household, Heterogeneous Units of Labor, Quadratic Functional Form, Considering Sample Selection Bias

Dep. var.: h	(1) E ≤ Sec	(2) E in HS	(3) E = HS	(4) E in C	(5) E = C	(6) E in GS
ŵhead	**.354**	**-2.034**	**-3.797**	**-2.830*****	**-6.690*****	**-1.667****
	(2.093)	(2.933)	(3.508)	(.998)	(1.166)	(.730)
ŵhead^2	**.014**	**.081**	**.235**	**.058**	**.165***	**.026***
	(.042)	(.318)	(.401)	(.043)	(.039)	(.013)
Cons	69.012***	74.698***	79.208***	75.364***	89.184***	73.906***
	(3.681)	(4.978)	(5.965)	(3.147)	(4.661)	(3.577)
End. reg. whead						
WEconMed	-.538***	.800***	1.160***	.010	-.511*	.257
	(.173)	(.279)	(.367)	(.195)	(.297)	(.185)
WEconMeansq	.364***	.080**	.017	.166***	.199***	.061***
	(.018)	(.033)	(.043)	(.021)	(.034)	(.009)
Cons	1.613***	.574	.373	.847**	1.776**	2.044***
	(.216)	(.361)	(.454)	(.387)	(.761)	(.689)
End. reg. whead^2						
WEconMed	-84.716***	-5.971	-3.222	-30.890***	-50.701***	-44.867***
	(8.724)	(8.815)	(12.683)	(11.303)	(18.906)	(15.687)
WEconMeansq	19.457***	2.105**	1.647	6.439***	7.768***	5.143***
	(.893)	(1.055)	(1.477)	(1.201)	(2.147)	(.771)
Cons	67.982***	8.594	6.252	10.172	47.792	63.329
	(10.866)	(11.469)	(15.714)	(22.708)	(49.067)	(58.853)

Source: Own elaboration using ENIGH2010. *** Statistically significant at 1%, ** Statistically significant at 5%, *Statistically significant at 10%. Standard errors between parenthesis.

Chapter 5

Conclusions

This dissertation studies and compares the individual and household LSC shapes of the American -developed- and Mexican -developing- economies, presents a static structural model -with a set of special cases- able to explain and replicate them, and discusses some of their economic implications.

Our results suggest that under both the standard assumption of homogeneous units of labor as well as heterogeneous units of labor, and regardless of whether the LSCs are estimated considering sample selection bias or not, the individual American LSC presents a backward bending shape. If just a linear functional form is allowed in the estimation, then a positive slope is supported by the data. Nevertheless, this slope increases at labor markets with more years of education, supporting (given the correlation between education and wages) an overall backward bending LSC.

For the individual Mexican case, homogeneous and heterogeneous cases -considering and not sample selection bias- exhibit forward falling LSCs; if just a linear functional form is allowed in the estimation, a negative slope is supported by the data, implying the existence, in all cases, of a survival constraint at low wages, not observed in developed economies. Considering these two economies with a different level of development together, or more specifically speaking, with different wage ranges, an international inverted S LSC is observed.

In the household case, our evidence suggests that under both homogeneous and heterogeneous units of labor, and considering and not sample selection bias, the American and Mexican observed LSCs follow a backward bending and a forward falling shapes respectively; however, if a cubic functional form is allowed, an inverted S shape is also supported by the Mexican data.

While estimating the individual and household LSC shapes, the importance of considering demographic characteristics becomes evident for the Mexican economy, where huge regional differences prevail. The American economy presents, relatively speaking, more uniform regional labor markets.

Regarding our household static structural model, it is worth noting that we are able to generate the negative slope at low wages thanks to the inclusion of a minimum survival level of consumption; and, we arrive to a close form solution thanks to the exclusion of $1/\sigma$ in a CES utility function and the use of only one value of δ for both agents -differentiating their preferences by different α_i-. Our proposed utility functions are well behaved, in the sense that they are increasing in its arguments, present decreasing marginal utilities, and are continuously differentiable.

We present the simplest individual static structural model -as a special case of our household model- able to generate a backward bending LSC; it only requires one simple assumption: leisure and consumption are gross complements. Therefore, considering the Cobb-Douglas utility function as the border -where the share of income spent in each argument is constant independently of prices-, we should have a utility function that lies in the area between the Cobb-Douglas and the perfect complement cases, where the share of income spent in one argument increases after an increment in its price. In the forward falling LSC model, we generate the negative slope thanks to the inclusion of a minimum survival level of consumption in the utility function.

Our results have non-trivial implications on optimal economic policies. In order to reduce the unemployment rate, the minimum wage (MW) should be decreased considering a backward bending shape in a competitive market; while the optimal policy could not be the same considering a forward falling or inverted S LSCs -the Mexican case-, thusly, additional research is required in this issue.

The forward falling and inverted S shapes also add a time constraint for achieving higher levels of education to agents that belong to households with low wages, given that these agents, of any age, should allocate more time in the job market. This conclusion is important in terms of public policies, because it demonstrates that to provide the population with free public education -this is the Mexican policy- is not enough to break poverty cycles.

For the Mexican case, given that the observed individual and household LSCs exhibit a negative slope at low wages, regardless of whether the estimated functional form is linear, quadratic, or cubic, to decrease the real MW -this has been the Mexican policy during the last decades- could not be the optimal economic policy.

For the American case, if the target consists in incentivizing the population with the highest wages to work more, then the optimal policy under a constant positive slope LSC requires to decrease labor-income taxes, while for the backward bending shape the optimal policy would be to increase these taxes.